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MANAISM: A STUDY IN THE PSYCHOLOGY OF RELIGION

By Ivy G. Campbell

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I. Introduction

In recent years a theory has appeared which purports to describe man's first explanatory reaction to his environment. For many years it was supposed that animism was this first reaction; but this new theory, variously called animatism, dynamism, manaism, pre-animism, etc., states that man first

* The writer wishes to express her thanks to President G. Stanley Hall, under whom this study was made, for advice and criticism; to Professor Mary Whiton Calkins for very helpful criticisms and suggestions; and to Dr. Louis N. Wilson, Librarian of Clark University, for courtesy and kindness in making available the literature for the study.

explains things, not in analogy to his own soul as animism holds, but rather by postulating a great force such as mana.[1]

The present study attempts to evaluate this claim, first by a consideration of the statements made by the upholders of the view, and second by a study of those beliefs of primitive peoples which afford the material for this contention. Not only the beliefs of primitive peoples quoted by the holders of this theory but also comparable ones from other parts of the world have been considered. The material for this second part has, for the most part, been taken from accounts of so-called primitive religions; and although to us these accounts seem to contain a mixture of philosophy, psychology, anthropology, religion, etc., they will here be largely treated from the angle of their relation to religion.

In treating the material from this standpoint four problems seem to stand out: first, what is the nature of this mana which has been so prominent in primitive beliefs; second, is it true that manaism represents an explanatory reaction prior to animism—and if not, what is the relation of the two concepts; third, is manaism religion; fourth, is it magic. As the discussion centering around the theory of manaism is one of such comparatively recent date, we have reviewed at some length both the material on which the theory has been based and the interpretations which various writers have made of this material. The reader is thus enabled to judge of the worth of the theories and of the justification of our criticisms. In presenting the compilation of material which we have gathered from reports of primitive peoples selection has been made of that gathered from parts of the world which have not previously found a large place in the literature of pre-animistic discussions. Since the data from North America and Australia have been previously extensively cited, this study, in order to uphold its contentions, stresses the data of Africa and Australasia, exclusive of Australia.

As is necessary in dealing with such large areas, the collection of material used is limited. Selection of reports by the most reliable workers has been made and preference has been given to those writers who have spent many years among the people whom they report. Material reported in the last fifteen years has been most often used because earlier reports

[1] Mana is a Melanesian term, generally interpreted to mean impersonal power—a term representative of the concepts on which 'pre-animism' is based. It is similar to such terms as Wakanda, orenda, kici, etc. We have used the term manaism to express the beliefs in regard to mana and similar terms.

are current in the literature of pre-animism and also because it seems to us that this later literature shows more of a tendency to report what the native actually states than to report interpretations of these statements. In the space of this article, the wealth of material on the subject can only be indicated, but if we have given enough to point out the seeming inconsistencies in the various reports and to indicate wherein the points of disagreement lie—it should be of value. Whether or not our interpretation of the material gathered, proves, in the light of later investigations, to be acceptable and true, it is hoped that it has at least added something to the discussion.

II. Nature of Manaism

We shall first give quotations from writers who in person have spent time among the primitive people whom they report. The authors state in these quotations what they think the primitive believes. These quotations are representative of the material on which writers have based a theory of pre-animism. We shall then give the various interpretations that have been made in regard to these beliefs. For the sake of convenience we shall call the first quotations, field-workers' reports and the discussions made upon the basis of these, interpretations. We realize that in the field-workers' reports there may be some interpretation.

a. Field-workers' Reports.

Dorsey (16:365) writes:—

"It has been asserted for several hundred years that the North American Indian was a believer in one Great Spirit." Very often Wakanda has been taken to mean a Supreme Being "but in the Ɛegiha, the language spoken by the Ponka and Omaha, Wakanda means "mysterious," or "powerful one." . . . Some of the old people say that their ancestors always believed in a supreme Wakanda or Mysterious Power."

Miss Fletcher (20:326-327) says concerning the Indian's belief in the nature of life:—

"The belief . . . involved two prominent ideas; first, that all things animate and inanimate were permeated by a common life; and second, that this life could not be broken but was continuous. . . . This power which brings things to pass is Wakon'da. The question arises did the Omaha regard Wakon'da as a Supreme Being? There is no evidence that he did so. . . . The word Wakon'da seems to express the Indian's idea of immanent life manifest in all things."

Mcgee (55:182) after enumerating many things that are called wakanda writes:—

"Thus the term is applied to all sorts of entities and ideas and was used indiscriminately as substantive and adjective, and with slight modification as verb and adverb . . . the idea expressed is indefinite, and cannot justly be rendered into 'spirit' much less into 'Great Spirit,' though it is easy to understand how the superficial inquirer . . . came to adopt and perpetuate the erroneous interpretation. The term may be translated into 'mystery' perhaps more satisfactorily than into any other single English word, yet this rendering is at the same time much too limited and much too definite. As used by the Siouan-Indian, wakanda vaguely connotes also 'power,' sacred,' 'ancient,' 'grandeur,' 'animate,' 'immortal,' and other words, yet does not express with any degree of fulness and clearness the ideas conveyed by these terms singly or collectively."

Major Powell in an introduction to Mr. Cushing's 'Zuni Folk Tales' (11:X-XI) writes:—

"In every language there is a term that expresses this magical power. Among the Iroquoian tribes it is called orenda; among the Siouan tribe some manifestations of it are called pokunt. Let us borrow one of these terms and call it 'orenda.' All unexplained phenomena are attributed to orenda."

Hewitt (33:33-36) in speaking of orenda writes:—

". . . primeval man made the further assumption that in every body of his self-centred cosmos inheres immanently a mystic potence of diverse efficiency and purpose. . . . This hypothetic magic potence is, then, held to be the property of all things, of all bodies, and . . . is regarded as the efficient cause of all phenomena, all the activities of his environment."

Jones (41:183) tells us that the Algonkin Manitou is a solemn religious word:—

"It is a property which is felt to be everywhere—it enters into everything in nature, it is active and assumes various forms according to the individual. . . . The Algonkin peoples his world with manitou forces different in degree and kind. . . . Each object and being has the investment of a common, mystic, virtue which gives them all a common name, and that name is manitou . . . but wherein one differs from the other is in the nature of its function, and in the degree of possession of the cosmic substance."

In these quotations we see that first-hand reports of Indian thought show us a belief in a pervasive all-powerful force in the universe, a force which is present in varying degrees in all things. A belief in a similar great force was reported to exist abong the Melanesians by Codrington (8:118-119):—

"The Melanesian mind is entirely possessed by a belief in a supernatural power or influence called almost universally, mana. This is what works to effect anything which is beyond the ordinary power of men, outside the common processes of nature, attaches itself to persons and to things and is manifested by results which can only be ascribed to its operation. . . . There is a belief in a force altogether distinct from physical power, which acts in all kinds of ways for good and evil, and which it is the greatest advantage to possess or control.

This is Mana. The word is common I believe to the whole Pacific. . . . It is a power or influence, not physical, and in a way supernatural, but it shows itself in physical force, or in any kind of power or excellence which a man possesses. This mana is not fixed in anything; but spirits, whether disembodied souls or supernatural beings, have it and can impart it; and it essentially belongs to personal beings to originate it, though it may act through the medium of water, or a stone or a bone."

b. Interpretations of these Reports

Students of Manaism have taken their clue from the reports from which these quotations have been given and have looked for evidences of such beliefs elsewhere. They have interpreted mana in a number of ways which may be roughly grouped under four headings: first, those who regard mana as a magical, impersonal force, the idea of which is obtained from observations of unusual natural phenomena; second, those who regard mana as a spiritual power, the conception of which arises from an unusual mental experience of an individual, such an experience as a great willing or emotional excitement; third, those who state that mana is an impersonal power, the consciousness of which comes through social activity experiences; fourth, those who regard mana as a personal spiritual power experienced while in social activities.

1. Impersonal, from the unusual.

J. King (44), who so far as we have been able to find was the first writer to bring together a number of different concepts of a great force such as mana, wakanda, boyla, states that man's first idea of force was not gained from personal beings but from physical force. This idea arose when something was incomprehensible to man. So long as things go smoothly man pays no attention to them, but let something baffle him and then due "to his very organic sensibilities" he will evolve the supernatural. Irving King (45) holds a somewhat similar view, in saying that those things which demand a "watch-out attitude" from man made him regard them as containing an unusual force. Preuss (61) states that the quality of *Verwandlungs-fahigkeit* in things gives rise to the idea of great force, mana. Hartland (30:679) states that there are certain characteristics of objects which make them appear very mysterious and that accordingly they are thought to have a "potentiality which is exactly expressed by the word, orenda." Schmidt (65) believes that mana is the power conceived through experiences with those things which will not fit into the normal or profane idea of causality. For Leuba (52) mana is an impersonal power, the concept of which arises from man's noticing the phenomenon of causal-

ity. To see how early man arrived at his idea of impersonal force Leuba goes to the child to see in what way *he* arrives at the concept. He finds that very early the child asks the question "What makes this go?" and observing this Leuba states (p. 78) "already he is in possession of the abstract idea of cause and effect." Leuba goes on to state that he believes that the idea of power implied in cause is that of an impersonal power and is in the child's possession before he is three years of age. In the same way primitive man arrives at an idea of impersonal power.

2. Mana as power, conceived from unusual mental experiences of the individual.

Brinton (3:47-60) interprets Wakanda as follows:

"The Wakan of the Dakota Indians is the deification of that peculiar quality or power which man is conscious of within himself as willing or directing a course to bring about certain results. . . . The universal postulate, the psychic origin of all religious thought, is the recognition or if you please, the assumption, that conscious volition is the ultimate source of all Force. It is the belief that behind the sensuous, phenomenal world, distinct from it, giving it form, existence, and activity lies the ultimate, invisible, immeasurable power of Mind, of conscious Will, of Intelligence, analogous in some way to our own and that man is in communication with it."

Moreover Brinton makes, what in the light of later discussions, we regard as a very significant statement, i.e., that this "Will-Power" is "posited" in moments of great excitement, "rapture, intoxication or frenzy."

Miss Fletcher has spent a great deal of time ascertaining the meaning of Wakanda. Of this common force running through all things she writes (19:598-600):

"While the conception of Wakon'da may appear somewhat vague, certain anthropomorphic attributes were ascribed to it, approximating to a sort of personality. . . . All experiences in life were believed to be directed by Wakon'da. . . . An old Indian explained 'All forms mark where Wakon'da has stopped and brought them into existence.' The belief that the power of Wakon'da is akin to the directive force of what man is conscious within himself, is implied in the old man's remark: each 'form' was the result of a 'stop' where there had been a distinct exercise of the will power, an act of the creative force of Wakon'da performed."

Again she writes:[2]

"In this conception man views all things from his own personality and from this standpoint predicates his relationship to animate and inanimate nature. Conscious within himself of an ability to move and to bring to pass, he regards motion, whether of body or of mind, as a universal ability and as the simplest and most fundamental mani-

[2] *Amer. Anthropologist*, N. S. Vol. 14, 1912, p. 38.

festation of a mysterious indwelling power that has brought all things into existence and is the cause of all movement."

Again of Wakonda she says (20:327):

"All things were distinct from man but in the subtle bond of a common life, embodying the idea of will or directive energy, they were akin to him and could lend him the aid of their special powers, even as he could help or hinder his fellowman."

Marett's view seems to be a combination of these first two explanations of mana. For him mana is the power which is thought to be in objects which excite awe. He writes (54:10):

"In response to, or at any rate in connection with, the emotions of awe, wonder, and the like, wherein feeling would seem for the time being to have outstripped the power of 'natural,' that is, reasonable, explanation, there arises in the region of human thought a powerful impulse to objectify and even personify the mysterious or 'supernatural' something felt."

This attitude of the mind, dictated by awe of the mysterious, Marett calls Supernaturalism. The objects which give rise to awe and are thus thought to have this extraordinary power are of many kinds; spirits, startling manifestations of nature, curious stones, animals, human remains, some diseases, blood, etc. One important source of awe that Marett especially stresses is that of magical acts. The heart of the magical affair he states is in the "spell" which in turn really reduces to an extraordinary exertion of will which is supposed to make the desired event take place. It is mana which accomplishes this end, mana—which "on its inner side is just this seemingly mysterious power of putting the magical act through, of willing semblance into reality." "The true source of mana immanent in the spell is the operator's exertion of will power." (p. 56.) Once the magician has gained the idea of this power through his own projective acts of will he will attribute the same power to all manifestations of the supernatural which appear to have great power. Thus we see that the idea of mana, great power, may arise from observations of unusual natural events or from unusual psychic events.

3. Power—conceived through social activities.

The third explanation of the genesis of the idea of mana is that the idea arises in social activities—when a great power is experienced.

Hubert and Mauss (37) in a very elaborate study of magic point out that the belief in a great impersonal force is the basis of all magical practises. The conception of such a force arises because the group acting together, as it does in magical practises, is very emotionally stirred and accomplishes things

it does not at other times. At such times the magician accomplishes wonderful feats and this suggests to the excited onlookers as well as to the magician himself that there is a great power at work. Without such a power magical acts could not be accomplished. In fact mana, the great power, is a "collective category"—a belief held to by a group of people.

Levy-Bruhl (50) in attempting to explain such beliefs as mana, states that primitive man's mentality must be explained by "collective representations," according to which all objects contain a mystic power. These "collective representations" are social achievements and are results of states of consciousness that contain much more of the affective and motor side of consciousness than of the intellectual. They are impressed upon the individual very often at times of social activity, and for this reason seem to have a great power back of them. Thus for Levy-Bruhl it seems to be the effect of the social experience upon the individual that gives rise to the idea of mana.

Miss Harrison, who from her extended studies upon ancient Greek religion comes to the conclusion that it is a great force which is at the bottom of the whole Greek religion, believes this great force to have been conceived from social activities. She writes (29:65):

> "In all excited states whatever be the stimulant . . . man is conscious of a potency beyond himself, yet within himself, he feels himself possessed, not by a personal god . . . but by an exalted power. The power within him he does not, cannot, at first clearly distinguish from the power without, and the fusion and confusion is naturally helped when the emotion is felt collectively by the group. This fusion of internal will and energy with external power, is of the very essence of the notion of sanctity."

Cornford (9) agrees with Miss Harrison in her interpretation of Greek religion and believes that he finds traces of this same social force, mana, in early Greek philosophy. Cornford contends that at first primitive man did not attempt to *represent* the power felt in his group activities—he merely felt and lived it. Collective emotion, desire and action were all that existed in this early time. However when man contrasted his own power with that of this collective power he then attempted to represent the power felt. Mana represents the kinship of the group. But kinship in early society meant merely the *functions* of the group, what the group felt and did. The behavior of the group was its essence. Primitive man necessarily represented this kinship under some material form—which form Cornford finds to be blood.

Durkheim (17) in an intensive study of the natives of

Australia finds that they have a concept of a great force similar to mana, which is especially noticeable in their system of totemism. This great power pervades all things related to the totem—the totem, the totemic representations, the totemic species and the members of the totemic clan. The concept of this great force is due to the form of society found in Australia. The Australian passes through two phases of life, that of every-day occurrences and that of times of social meetings, *corroborrees,* when dances, etc., take place. At these latter times man is very much excited, is taken outside of himself, feels that he is entered by an outside force, finds himself able to do things that he could never do before. Feeling this power to be entering him from the outside he looks around for its source and his attention centres upon the most prominent thing in his environment, which in this case is the many representations of the totem which are present as marks on his instruments, bodies, etc. These are regarded as the source of this power and gradually this power comes to be attributed to all things connected with the totem. Durkheim believes the contrast which man must make between the times of social activities and those of daily commonplace life gives the empirical foundation for the basal characteristic of all religions, namely, the division of things into sacred and profane. We omit at this point our criticism of Durkheim's contention, that since Australian society is based upon the most primitive form of society known, i.e., the clan, and that since totemism is the religion based upon this clan system it must hence be the most primitive form of religion, since the point has been very ably raised in an article by Goldensweiser.[3]

4. Mana, a personal, spiritual power—conceived through social activities.

From our own study of such concepts as mana, wakanda, etc., we believe that among the peoples who hold this belief mana is thought to be a great personal spiritual power and that it is a concept which is gained through great social activity. We cannot accept mana as an impersonal force for reasons set forth in the next section. As to this force being spiritual nearly all field-workers do so call it, e.g., Fletcher, Powell, Mcgee, Codrington, Tregear, Junod, Dennett, Warneck, Neuhauss—and in the light of the use made of this concept by primitives we cannot see how else it could be interpreted. As an example of this use let us look at reports from Melanesia.

Codrington (8:119 seq.) reports that mana has three sources

[3] *The Journal of Philosophy, Psychology and Scientific Methods,* Vol. 14, No. 5, March 1, 1917, pp. 113-123.

—a spirit, a dead man's ghost, a living man. If a man has mana it resides in his spiritual part. Moreover you cannot say that a man *is* mana only that he *has* mana. After a man's death his soul becomes a ghost but only if during life he has had mana does his soul become a tindalo, "a ghost of worship." Marett (54:118) points out that mana comes very near meaning soul or spirit and turns to Tregear's dictionary to uphold this statement. "Mana from meaning indwelling power naturally passes into the sense of "intelligence," "energy of character," "spirit;" and the kindred term *manawa* (manava) expresses "heart," "interior man," "conscience," "soul;" whilst various other compounds of mana between them yield a most complete psychological vocabulary—words for thought, memory, belief, approval, affection, desire and so forth."

Such statements are widespread as we shall see when we take up this concept among the primitives themselves and cannot but convince one that by mana the primitive does mean some sort of a spiritual power. But even if the primitive did not explicitly state that he does mean spiritual power—how else can power be conceived? As Hume long ago pointed out we cannot gain an idea of power from the mere observation of external events. Such an idea must come from within our own consciousness. On this point we will quote Miss Calkin's admirable summary of the subject (5:457-458):

"Energy is generally defined as capacity for work. Narrowly scrutinized, this statement means simply that energy is conceived as the further undefined cause of phenomena; and energy is thus reduced to a relation, causality, already claimed by the idealist as ideal. Many of those who conceive of reality as energy, seem, however, to mean by energy force. But force is defined in one of three ways: either as resistance, a quality directly revealed through muscular sensation; or as a cause of motion; or as no more or less than a mathematical ratio, a measure of motion—the force of B on A being defined as 'the product of the mass of A into the acceleration of A due to the presence of B.' But each of these is a conception of the ideal, not of non-ideal reality. A mathematical relation is a mental conception; the resistance or stress which (to quote Montague) is immediately felt when a man places 'his hand between a fixed spring and a body moving uniformly into collision with it,' is a sensible quality; and motion, . . . is made up of spatial and of temporal relation. . . . You can give no unchallenged account of these qualities and relations, except as distinctive ways of experiencing, that is, of being conscious."

As to the genesis of this idea of power we agree with those writers who contend that this is given rise to by social activities. During such experiences, more than in any others, man feels himself a much greater being than he has ever felt before. He accomplishes things that he could not accomplish

before, and acting in common with others he feels himself a power never felt before. Social activity is the adequate stimulus which sets off a specific response, namely, feeling the self as a greater power than it has ever felt before.

Such an interpretation of the facts does not demand a certain sort of society to give rise to this experience of expanded greater self, but any activity involving a larger number of persons than the individual is accustomed to acting with will furnish the adequate stimulus. Such group activities are universal. Then when once this power has been experienced within the self, it can then be projected and used to explain anything that seems great. This is why we so often in primitive studies meet with the statement that mana is the power which is found in the extraordinary. Mana is the extraordinary self power felt when in the social activity and when once this power has been experienced, objects performing extraordinary feats are then explained as acting by means of this great power.

And to say that the social does play a very large part in the affairs of primitive people is not biasing the facts. So large a rôle does the social play with these people that many writers have been tempted to omit the equally prominent individualism, displayed in primitive society. Although it is a fact that the most important occasions of a man's life seem to be those of social importance, nevertheless at such times he is still regarded as an individual. Take the widespread initiation ceremonies where elaborate ceremonies are performed in order to initiate the boy into the tribe. Places sacred to this ceremony are often found, instruments used only at these times are stored away in sacred places, certain men devote their time to preparation for these festivals. Such a ceremony may last for ten days, during which time all other activities are suspended. Such time and energy devoted to the task of making a boy become a member of the tribe cannot but impress him with the power of society. And especially as these ceremonies make such an appeal to the emotional and active motor life, we cannot be surprised that the primitive holds that the society has in it some remarkable, wonderful, power, not generally experienced elsewhere. In Polynesia and Melanesia, it is pointed out by Hubert and Mauss, that the success of the chase, fishing, war, is believed to depend upon the social solidarity maintained during this time. Crimes against society which at other times go unpunished, are at these times punished by death. These same writers speak of an ancient Madagascar text which tells how when the men

are away at war the women stay up all night, keeping up the fires, dancing and chanting all night. The Dyak and New Guinea women do the same, in their chants calling for power for their absent warriors.

Among primitive peoples collective willing is very common. Take for instance the rite of Wa-zhi*n*′-dhe-dhe among the Sioux Indians, as reported by Miss Fletcher (22). This was a rite, where through the singing of songs strength could be sent to an absent warrior in the stress of battle. The Omaha women gathered at the tent of an absent warrior and sang the songs. The songs were the medium by which the strength was conveyed to the man facing danger. Another Siouian ceremony, showing the belief in the power of collective willing, is that of Wa-zhi*n*′-a-gdhe. This was a rite peculiar to the Han-he-wa-chi, a society of men, each of whom had done one hundreds or more deeds called Wa-dhi*n*′-e-dhe, deeds which could be accomplished only were supernatural power granted to them. These men met together and by means of collectively exerting their will-power and by singing certain songs peculiar to this society, they willed that the full consequences of a certain line of conduct would fall upon a person who of his own accord had determined upon this line of conduct. This act left the victim isolated from all helpful relations with men and animals.

A somewhat similar idea is shown among the Kenyan people of Borneo (36: vol. I. 121). During a ceremony known as soul-catching, in which a professional soul-catcher sends his soul after the soul of the man who is ill, the soul-catcher (Dayong) struts back and forth chanting a form of words well known to the people, who are sitting around in a circle and who come in on a sort of a chorus saying, "Bali-Dayong," meaning "Oh powerful Dayong." In fact in all magical practises among these people the men and women sit around a central figure and join in the "Bali-Dayong." By the work of group volition they hope to effect their end.

Hodson[4] gives us an interesting example of the force of collective willing. The Manipur tribes hold *gennas* (times when all the members come together and perform certain rituals). A sacrifice is always made at these *gennas*. This is led by the *khullakpa*, the village priest, who "acts whenever a rite is performed which requires the whole force of the community behind it, and this force finds its operation through him. These village *gennas* seem in many cases to be inspired by the belief that man, *the man*, the khullapa, when fortified by the whole

[4] Hodson, T. C., *The Naga Tribes of Manipur*. London, 1911, p. 141.

strength and will of the village, is able to control and constrain forces which are beyond his control if unaided."

Marett (54:119) gives us an example of the belief in the power of individual willing in the case of the native of the Solomon Islands who sent him the words of a *mana* song but who said that with it Marett could not perform miracles. In order to do this he must send the native money and then "ipso facto he will transmit the mana to you—as we should say, the 'good-will' of the concern."

The prominence of Totemism as a primitive belief shows the important rôle of the social. Totemism is a bond which holds all of the members of a group together. All of this group must act together, must obey the same customs, respect the same powers, etc. Durkheim has proved, it seems to us, that the thing reverenced, feared or what not, in totemism is the power behind all the badges, members, etc., connected with a certain totem. This power he has shown to be the power felt by the members of a certain group when they are acting together. Miss Fletcher speaks of totemism in the following way (20:331):

"From the study of minutiae of the customs and ceremonies within the gens, it is apparent that the underlying purpose was to impress upon the people the knowledge and the duties of kindred, and that one of the most important of these duties was the maintenance of the union of the gens. This union of kindred we find to have been guarded by the agency of the totem."

Magical practices are extremely widespread among primitive people and these practices, if we accept Hubert and Mauss' careful and elaborate study, are based upon the prominence of the power which primitives attribute to the social.

All workers among primitive peoples are impressed by the rôle which social ceremonies play among these peoples. A statement by Haddon (28:51-52) shows this very admirably.

"It is difficult for us to realize that awe and reverence that was felt by these people for these social ceremonies and it must be admitted that this intense feeling combined as it was with reticence and discipline had a strong educative effect upon the people. For this reason, if for no other, these ceremonies are worthy of a very careful study. Whatever tends to take a man outside of himself and to weld him into a solidarity, limited though this may be, is an upward step in the slow and laborious evolution of man, and deserves our sympathetic respect. The paraphernalia of nearly every ceremony of all peoples are generally foolish, and often grotesque, to the outsider; but they awaken deep religious sentiment in the true believer. . . . There cannot be the least doubt that these sentiments exist among so-called savages and those who scoff at their ceremonies thereby condemn themselves."

Many persons will grant the prominent rôle of the social among primitive peoples and yet will not perhaps grant that it holds such an important place as does the concept of mana, which, as Codrington points out, is the power that all Melanesian religion and magic is attempting to obtain and which Hubert and Mauss contend all magic is striving for. It may be objected to our thesis (that mana is the power felt during social activity) that though men may act together in order to obtain mana—this does not make mana the power felt at such times. But from what other source can the idea of mana power come? We believe that it must be based upon some empirical experience. Man knows power only when he experiences power and where is the experience that will give him the idea of this great power? Surely we will all grant that during social excitement, especially when we are taking part in the social activities, great power *is* experienced. And since in primitive society nearly always the important occasions are social ones, we should expect this social power to play a large rôle. The primitive magician must have a sympathizing audience in order to work himself up to the state where he can accomplish great feats. And it is interesting to note that very often it is stated that the magician is the member of the tribe who has the greatest amount of mana. And again as Codrington points out, the position of a man in society is determined by the amount of mana which he possesses. And, as is shown by the common custom of the group getting together and by chanting attempting to send the power of the group volition to an absent one—we see that the primitive realized the power of concerted effort. From the very instinct of gregariousness man was bound to find out that acting together gave more power—especially would this be true in primitive society, where due to the relative simplicity of the life, the members of the tribe came together more often in tribal ceremonies. The almost universal ceremony of initiation indicates the prevalence of ceremonies which we believe could not but give rise to the consciousness of great power. Psychologically speaking, what this power is, is hard to say. It may be due to some physiological basis, such as Cannon has shown to be present in certain emotions. In the same way that the emotion of fear has often been correlated with the instinct of flight, we should be inclined to state that in this power felt during social activity is found the psychic correlate of gregariousness. This consciousness would undergo all degrees of intensity, which when it had reached a very strong intensity and was fused with the consciousness of

strenuous willing and acting would be called mana. We realize that careful introspective evidence is needed before such a suggestion could be finally held—but from our study of this concept among primitive peoples we cannot but believe that a careful analysis would yield a state of affairs somewhat as we indicate.

In such careful regional studies as those of Durkheim, Miss Harrison, Cornford, we believe that mana has been shown to be social and here we can but refer the reader to the studies by these writers if he wishes further proof of this contention. We may briefly indicate how Miss Harrison works out this idea in the Greek religion. It has generally been supposed that such a religion as that of the Greek Olympians represents a gradual personification of nature forces but Miss Harrison shows that even Zeus is merely a "projection of group-consciousness." This thesis Miss Harrison defends on the basis of an analysis of a recent archeological fragment excavated at Pahaistro. On this fragment is found a "Hymn of the Kouretes," a description of the older cult of Zeus which had its seat at Mt. Dikte and not on Mt. Ida. In this hymn we find Zeus addressed as the "Greatest of Youths" and he is called upon to come at the head of his Daimones, a fact that shows Zeus was once regarded as the "functionary" of a group. By "functionary" Miss Harrison means a personification of the power felt in group activities. Moreover in this hymn we find a description of Zeus undergoing the same sort of ceremonies that an initiate into primitive societies must to-day undergo. He is supposed to die and then be brought back to life. This seems to be an expression of the idea apparently almost universal, that in order for a youth to be a complete or worthwhile individual he must become a member of society, must experience social consciousness. This idea of the new birth among the Greek cults is, Miss Harrison believes, merely an expression of this idea of tribal initiation and not the revival of Spring, as has so often been held. Of this initiation Miss Harrison writes (29:19):

> "Till the boy has died and come to life again, till he has utterly put away childish things he cannot become a full member of the tribe, he may not know the tribal secrets or dance the tribal dances . . . he cannot perform any of the functions of a full-grown man . . . at and through his initiation the boy is brought into close communion with his tribal ancestors he becomes socialized, part of the body politic. Henceforth he belongs to something bigger, more potent, more lasting, than his own individual existence; he is part of the stream of totemic life, one with the generations before and yet to come."

We believe then, that the consciousness experienced during social activity is the only one that could give rise to the concept of a great power such as mana. Such a power once experienced is afterward used as an explanatory concept which is applied to all things that seem extraordinary, all things that arouse awe or wonder or fear in man. These emotions in themselves will not give one the idea of power. Goldenweiser[5] criticizes Durkheim's statement that the primitive contrasts the feeling of the social self with that of the everyday self, and appealing to similar situations in modern man states that the individual *identifies* rather than contrasts himself with the social.

"The individual identifies himself with the group, with the crowd; he represents himself as sharing in the power which is of the crowd, of the group. *We* thought, *we* felt, *we* did, is for him descriptive also of his own part in the proceedings. Social settings of this variety are so constant, so common an experience in the life of man, ... that the average . . . individual never thinks of contrasting these experiences with others, or of regarding his crowd or group self as transcending the self of his daily routine. On the contrary, the crowd or group self is the self *par excellence*, as well as the self at its best."

This quotation is a little hard to understand. If, as it seems to admit, the self is regarded as at its best when in society, then this is all that is needed for Durkheim's theory. Goldenweiser goes on to point out that what is common in a group experience is the crowd psychology, not a specific emotion aroused. The emotion varies with the different crowd psychological situations. A crowd psychology situation may transform but never create a religious thrill. Now our contention has been that there *is* a specific state of consciousness experienced when in group activity. Doubtless, as Goldenweiser states, we may experience joy when in a crowd and it still remains joy—we may experience hatred and have it remain hatred—but if consciousness of group-self comes it is different from these specific emotions—it is consciousness of heightened activity—heightened power—of self *par excellence*, as Goldenweiser states. It is this power that is realized to be a contrast to that of everyday, individual action. As the primitive so often says, it is the extraordinary self that has mana just as it is the extraordinary external event that is due to mana.

III. Is Mana Impersonal?

Most writers in describing mana have called it impersonal and since we have called it personal we are bound to consider

[5] *Loc. cit.*, p. 122.

what is meant by these terms personal and impersonal. In the discussion in regard to mana we believe that the term impersonal has been used in one of three ways; as equivalent to (1) mechanical, (2) non-bodily, (3) super-individual.

Such writers as Schmidt, J. King, and Leuba who hold that mana is a force distinct from spiritual power or force use the term impersonal correctly we believe—but do not prove by appeal to the facts that it applies to mana. As we have stated before nearly all of the field-workers report mana as spiritual. But even if we did not have explicit statements that mana is spiritual, in what other way can force or power be conceived? As we have pointed out before force can not be other than ideal. Marett in a way seems to make mana mechanical force when he points out instances of external events giving rise to the idea of power. Goldenweiser[6] also contends that "mana requires nothing but nature, acting, and man's mind, acted upon." Mana is[7] "impersonal magic potency . . . to which, on the subjective side, corresponds the religious thrill." Again[8] "manifestations of the powers of nature always did, as they still do, impress themselves on the mind of man and arouse in him that thrill or recoil which constitutes the emotional nucleus of religion."

One cannot deny that great events in nature impress man—that the emotions of awe, wonder, fear, etc. are aroused by these happenings—but to react with a certain emotion in the face of a certain stimulus is not to be religious as we shall contend in a later section. An active relationship must be assumed before we have religion proper. Moreover to jump from the passivity of an emotion to the activity of the cause of an emotion seems unjustified to us. Mana is an explanatory principle. "It is or has Wakanda" is said of the extraordinary man or event. It is not the fear that the lightning causes in us that makes us say that it is powerful—it is what the lightning does. What it does is perfectly evident the first time that we encounter it—but why, by what means it does this—requires an explanatory principle. This we have in mana. Lightning can blast a huge tree because it has *power*—it has that same force which we sometimes experience when we have the consciousness that we can do great things. Such a consciousness must be aroused by some adequate stimulus—and this we believe to be found in a group activity.

Most reporters and interpreters of mana *admit* that mana

[6] *Loc. cit.*, p. 120.
[7] *Loc. cit.*, p. 113.
[8] *Loc. cit.*, p. 116.

is spiritual or quasi-spiritual force and yet state that it is impersonal, by this meaning either that it does not belong to one concrete individual human body or else that belonging to all members of the group it cannot be personal.

Hubert and Mauss (37:105) speak of mana as spiritual power and yet call it impersonal. They grant however that this impersonal power tends to become represented by means of "Demons"—for man seems to judge it a more concrete representation of power when placed in a personal being. They contend, however, that the idea of a spiritual person represents very poorly the general anonymous force which gives efficacy to the magician, words, gestures, power of regard, intention, etc. These writers state that "the representations of magic are personal or impersonal according to whether or not the idea of individual beings is present." From such statements it certainly is suggested that a *body* must be present in order that the word personal be used. Of course if they simply mean by individual, the consciousness of self, then we cannot see why power based upon an experience of self should not be called personal. Of course this may be a matter of different usage of terms but if so it is a usage that has caused a great deal of confusion. It seems to us that the word personal may be used of all spiritual experiences while impersonal refers to what is generally classified as mechanical. Some writers would probably wish to retain the word personal to apply to body. But why should personal designate the body? By personal one generally means all that belongs to a concept of a self. Self very often means to a person the mass of feelings, willings, etc., that he experiences, without any conscious reference to body. Now if attention has centred upon this direct experiencing of feeling or willing, and in the future, things are interpreted in the light of the power felt during this experience, why call it impersonal?

Workers among primitive peoples show very clearly that what a primitive stresses in a thing is not its external bodily form, but rather it is the power that is thought to be in this thing. Much "pre-logical" thinking has been attributed to the primitive on the ground that he seems to disregard the law of contradiction. For instance it is stated that the primitive believes that a man can be both himself and a totem animal at the same time. But what is thought to be the same is not the external form but rather the power that is shared by both. Levy-Bruhl expresses it in this way, "d'uns sorte de symbiose par identité d' essence." Radin (62:351-352) in arguing that the Indian belief is in spirits rather than in the

supposed all-pervasive force says that a confusion has arisen from not observing what the Indian believes in regard to spirits. Because spirits are not observed to have individual shapes, reporters assume that an impersonal non-individualized force is intended. But

"we are apt to make an unjustifiable assumption. Our ordinary division into personal and impersonal is made on the possession of corporeal characteristics, which are in turn dependent upon our sense-perception, sight, hearing, touch, etc. Ordinarily too the presence or absence of corporeality is the test of its reality or un-reality. What right have we to assume that the Indian makes the same classification and equates reality, with existence? To judge from specific inquiries made among the Winnebago and Ojibwa and from much of our data in general, reality does not depend necessarily upon sense impressions. . . . It is I believe, a fact that future investigations will thoroughly confirm that the Indian does not make the separation into personal as contrasted with impersonal, corporeal with impersonal in our sense at all. What he seems to be interested in is the question of existence, or reality, and everything that is perceived by the sense, thought of, felt and dreamt of exists. It follows, consequently, that most of the problems connected with the nature of spirit as personal or impersonal do not exist. . . . Whatever is the object of his thought and feelings exists."

We have given this quotation at some length as it represents the view of a first hand observer of these peoples. Radin points out that it does not follow from the fact that the primitive does not conceive of mana as invested in a certain shape or body, that he therefore necessarily conceives of it as impersonal.

Jones (41:185) brings out the same point in dealing with the custom of the sweat-lodge among the Algonkins. In this custom the manitou which is supposed to reside in a stone comes out of its abode and enters a man. The manitou in the stone is supposed to be "an objective presence; it rests on the sense of an existing reality with the quality of self-dependence; it rests on the perception of a definite, localized personality. Yet at the same time there is the feeling that the apprehended reality is without form and without feature."

Another reason that these writers give for calling mana impersonal is that it is super-individual. Mana for Miss Harrison, Durkheim, Hubert and Mauss, Cornford, is that power experienced in the part of an individual's consciousness which they call collective. When man takes part in social activities he has a very different consciousness than when he acts in isolation, and since his consciousness is shared by all, it is, these writers contend, not personal.

Cornford (9:81) speaks of it in this way,

"Outside of each individual private world of inner and outer experience, *i.e.*, of inner and outer sensations and movements directly connected with the states of the organism there is what we have called the collective consciousness of the group as a whole. This consciousness, unlike the individual consciousness, is the same in all, consisting in those infectious or epidemic states of feeling . . . which at times when the common functions are being experienced invade the whole field of mentality and submerge the individual areas."

Cornford finds that it is this collective consciousness which is read out into any specific field of nature and forms the "daemons" of Greek religion—a thesis which Miss Harrison also defends. These "daemons" are not specific concrete individuals but merely "functions," the "group-behaviors." It is for this reason, Cornford states (9:97), "that daemons in Greek theology, as elsewhere, remain impersonal; they consist of will and force without individuality, because they are each the soul; not of an individual but of a species or kind to which they are related exactly as a 'daemon' of the human kindred is related to the group." Miss Harrison extends this idea of the content of an object being merely its "functions" to the Olympian gods, stating that at first these gods were merely a projection of the consciousness felt during group activity. Later when the group had a leader we see such individual gods as those of the traditional Olympians. In the festival of the Oschophoria Miss Harrison (29:325) points out, "the very act of transition from the periodic festival with its Eniautos-daemon to the cult of the individual hero; from, in a word, the functionary to the personality."

On psychological grounds it is a little hard to understand just what is meant by this distinction of personal and impersonal. If it is mental experiences that make up the consciousness of self why is it that certain ones of these should be called personal while others are called impersonal. Doubtless in a group activity when all the members are filled with similar states of consciousness we have what may be called a collective consciousness, but surely this is for each member merely the emotion or what not that *he* is feeling. The power experienced at this time may perhaps be thought to come partly from the outside but all the time it is felt as the self experiencing it. Because this consciousness is *stimulated* by the group action is not sufficient reason to call it impersonal. This consciousness is doubtless of a very different quality from that experienced when the individual is in isolation but at both times it is certain mental complexes that are being experienced by the same individual. Durkheim says that our soul is made up of two factors—social consciousness incar-

nated in each individual and the bodily factor. But we believe that the consciousness of the self is made up of the two factors mentioned above, i.e., the consciousness felt while acting in isolation and that felt while acting with society. We shall consider this point at more length in the next section.

If mana then is spiritual power what is its relation to the soul as this has been conceived? We have stated that mana for us is merely a certain self power experienced under specific conditions. It would be very valuable if we could state in just what the consciousness of this power consisted, but such a statement would be worthless without careful introspective analyses of such states of consciousness. But though we cannot now state what the *content* of such a state of consciousness is, it is at least valuable, we hope, to point out that such a state exists and to express the belief that some day such states will be subjected to careful introspective analysis. We can only indicate now that we are inclined to think that into this consciousness of great power, would come some experience of conscious function or of consciousness of self-activity, such experiences as are now being pointed out in some introspective studies on will, etc[9]

IV. Is Manaism Prior to Animism?

It is the usual thing at the present time to speak of the doctrine of manaism as prior to that of animism—to call it pre-animism. The discussion in regard to this question has shown in what a loose, even confusing way, this term animism has been used. The specific formulation of animism is, as is well known, the work of E. B. Tylor (73). Tylor, working with data gathered from among a large number of primitive peoples, found what seemed to be a belief in a "soul." This "soul" was a something variously described; at times as the shadow of a man, at other times as a small man within the man. This "soul" was the principle by which all things were explained. Tylor believed that the concept of this "soul" arose as the *conscious* answer to the question which presented itself to primitive man in regard to the phenomena of dreams and of death. The dreamer saw persons he knew had long been dead and from this concluded that there must have been something within the body that did not disappear when the body did. This observation added to the belief,

[9] Cf. A. Michotte et, E. Prüm. 'Etude Experimentale sur le Choix Volontaire et Ses Antecedénts Immédiate.' *Archives de Psychologie*, 1911, x, p. 194.
N. Ach. 'Über den Willensakt und das Temperament.' Leipzig, 1910.

universally held among primitive man, that life is present in everything in the universe, gave rise to the concept of a ghost-soul.

Some writers have adhered to this strict usage of animism but other writers would include under animism all beliefs which rise through the reading of one's own experience into other things; i.e., even before there arises the idea that there is within one a double which is separate from the body, whatever other experiences are had are read out, projected. This period when willing etc. experiences are read out into things Marett would call "animatism."

This usage of animatism seems perfectly justifiable to us, if what it means be kept clearly in mind. Tylor used animism to mean the belief in ghost-souls and it might lend itself to clearness to retain the term for this purpose. But do not let us extend this restriction to mean that there was a time when man did not have a concept of the soul—the soul meaning self-consciousness. Marett (54:14) illustrates his usage of the two terms in the following passage,

> "Thus, when a thunderstorm is seen approaching in South Africa, a Kaffir village, led by its medicine-man, will rush to the nearest hill and yell at the hurricane to divert it from its course. Here we have awe finding vent in what on the face of it may be no more than a simple straightforward act of personification. It is animism in the loose sense of some writers, or, as I propose to call it, *animatism;* but it is not *animism* in the strict scientific sense that implies the attribution, not merely of personality and will, but of 'soul' or 'spirit' to the storm."

If one wishes to use the term animism in this way, as we have said, it seems to us justifiable—but to restrict the term soul to mean merely the small ghost-like "mannikin" that is often thought to be within one—does not seem justifiable. The word soul has been so widely used to mean self-consciousness that it cannot be restricted to the sense found in Tylorian animism. Soul for the primitive has not meant merely dream-double as we shall point out in our next section. Soul means self-consciousness and as such has always been present to man's consciousness. This consciousness did not begin at some specific period of human evolution. The concept of self has always been used as an explanatory principle just because the anthropomorphic tendency of man has always been so strong. It was this tendency that made man use the great power, mana, to explain external events. Mana is not *prior* to the soul for it is a *part* of the soul. Mana does not represent an idea that has grown up in an historical sense, but represents a definite psychological experience that comes to

every man. The different things that have been explained by means of mana may be a matter of historical setting or evolution but the genesis of mana as such belongs to man as man.

But the statement by many writers that manaism is prior to animism is for them more than a difference in usage of terms—it involves a denial to the primitive individual of the consciousness of self. By these writers animism is used in the sense in which Marett would have us use animatism; i.e., to mean the consciousness of personality, will, etc., which in turn is ejected outward as an explanatory principle. These writers contend that a great power such as mana is conceived *before* any idea of the soul (self) is present. They state that man does not at first, explain things in analogy to his own soul (used in the sense of self) for he is not yet conscious of himself: he is not yet consciously differentiated out from the group of which he is a member.

Miss Harrison (29:122) in speaking of the system of totemism, which she believes to be based on some such force as mana, states that man at this time has not yet drawn a distinction between himself and a kangaroo for he has not yet said, "This is I." At this time, "his human will is felt chiefly as one with the undifferentiated mana of the world." Levy-Bruhl holds to the same idea when he states that at first man was merely conscious of "participation" but that later as he began to notice himself the idea of the soul arose. Cornford contends that he finds no animistic doctrine in early society. At this early time man feels himself as continuous with the group—the collective life pervades him and he has as yet made no distinction between his own and the collective power. But gradually as self-consciousness comes, the collective consciousness also becomes individualized and we have the idea of the soul come forth. The soul is really only a "pool of mana."

From these representative statements it is plain that it is the supposed complexity of the idea of the soul that makes these writers deny the concept to primitive man. Primitive man simply had not reached the stage when he realized that he had a soul and hence he could not read his image into the universe. But to have an idea of the soul does not mean that you must have some complex, logical idea of it. Doubtless the primitive man is not a Hegelian but he does have some consciousness of self, just as every human being does. These writers seem to think that you must have some definitely formulated concept which you then consciously use as an explanatory principle, in a logical sense. But this is not

necessary for an animatistic doctrine. It seems absurd to us to deny to primitive man an idea of himself when it is generally admitted that there is such a primary emotion as self-elation. Is primitive man to be denied the primary human emotions? Moreover it is not necessary that man in a rational fashion "read" himself out into things. This may very well be accomplished in some affective way—in such a way as has been pointed out in the "affective logic" that has been worked out by Ribot, Maier, Baldwin. These writers show that generalization may be effected as well upon the affective side of consciousness as upon the sense side.

To sum up, then, we have granted that there is a group of facts found among primitive peoples which cannot be placed under the concept of animism—if by animism is meant the doctrine according to which all things in the universe are interpreted in analogy to the human soul, when this soul is thought to be like an image seen in dreams, trances, and so forth. But we have not been willing to grant that the primitive does conceive of his soul in this manner, i.e., we are not to compare his idea of dream-double with our idea of soul, as self, and suppose we are comparing the same concept. We do not deny that at times the ideas of the dream-double and the shadow have played a large, even fantastic, rôle among primitive peoples, but we do not believe that the primitive confuses these ideas with that of the soul or self.

If our contention is correct that mana is simply the power felt within the self when, due to social activities, it feels very efficient, feels an efficiency which contrasts strongly with the efficacy usually felt, then we should expect to find that the primitives had a concept of these different self-efficiencies. And this we can find, we believe, in what has been reported to be a belief in several souls. These supposedly different souls are only different experiences that the self undergoes. The following point of view kept in mind during the investigation and interpretation of such beliefs would throw, we believe, much light upon the discussion. Such a view contends that primitive man functions in the same way as a modern man, just because he is a human being. His social and historical heritage may be very different—but when it comes to the human conscious experiences he is the same being whatever his state of culture may be.

Man notices that he is a living being and he also notices that he has certain mental experiences. Moreover he has such experiences as dreaming, trances, recovery from seeming death, etc. Again he notices shadows. Also as a normal human being

he has an experience which, though mental, is different from all of these in that it seems to make him so much more powerful, namely the experience he has when taking part in a social activity. During this experience the self is felt as much greater than it has ever felt before and yet there is also a sense of identity.

As to the relation of these ideas in the mind of the primitive, our reading of the data shows a state of affairs somewhat as follows. Dream-doubles are not thought to be the same as the consciousness of self, this latter being the experience to which we would confine the use of the term soul. There is a spiritual, i.e., mental part of man which is different from the bodily as well as from the dream-doubles and it is this which is thought by the primitive to be the soul (when used in our sense of self). Mana is the power which like the soul is spiritual, personal—though just how they conceive it to be related to the soul is not so clearly stated. There are indications however, that as Codrington says, mana is thought to be a certain part of the soul or of some souls. Codrington says that mana is not soul for not all persons have mana while all have souls. This is a thing that should be expected. When sufficient observations have been made to show what mana power can accomplish—then when it comes to serve as an explanatory category, only those persons who live up to this standard will be said to *have* mana.

The question of the priority of manaism seems to us then irrelevant. We cannot find any culture where the concept of mana is present that there is not also a belief in spirits in the sense of ghost or dream-doubles. Either concept may assume the leading rôle and which concept shall thus be made most prominent in a certain society, depends upon some "happy chance" just as specific taboos do. Both of these concepts will be present, though with varying degrees of emphasis, just because they are founded upon normal psychical experiences. Such a view does not make primitive man a Berkeleyian philosopher—but makes him like a child (or an adult for that matter) who kicks the chair when he stumbles over it. It makes him a being who tends to anthropomorphize his experiences.

V. Application of Our Theory to Representative Primitive Data

In attempting to apply this theory to the facts gathered among primitive peoples, we encounter many difficulties, but most of all that of contradictory reports. For instance for

many years two Kaffir terms, itonga and idlozi, were reported to mean the same thing, namely, ancestral spirits. Dudley Kidd (43:282 seq.), believing that these terms did not mean just the same thing in the native's mind, during a period of fifteen years tried to find out just what these terms did mean to the native. As his analysis seems to be so much in point, we abstract from it at some length.

The idlozi is an individual thing born with the child in the course of nature, is never lost during life, even though the person should become a Christian. At death the idlozi continues its individual existence near the grave of the dead man. The idlozi cannot transcend space and each man has an idlozi to himself. The itonga on the other hand may be divided among the various members of the family. It is not born with the child but is imparted to it by a ceremony after birth. It can depart from a person who abandons tribal custom. It then returns to the grandfather or to the bosom of the amatongi (ancestral spirits) from whence it came out. It has the power of being in several places at once and may be living in the huts of a number of persons at one and the same time and can also at the same time be an immanent spirit in several people at the same time, as if it were a deity or being of wide powers. In fact a hundred people may share an itonga. When the tribe migrates the idlozi of the individual stays near the grave while the itonga goes with the tribe. Mr. Kidd suggests that the idlozi is the individual side while the itonga is the corporate or clan side of personality.

In our more detailed study of the beliefs of certain African and Australasian tribes, let us first consider whether these people *do* mean by the soul what we have contended they do—namely, a consciousness of self or mental experiences. So often it has been stated that by the soul these people mean the mere phenomenon of living or they mean the shadow or they mean the dream-double. That the primitive does relate these things in an intimate way, a way which often leads to confusion in dealing with their beliefs, we must of course grant—but there are too many indications that these things do *mean* different experiences to him to allow us to group all the experiences together and say—this is what the primitive means by soul.

Nassua (57:53-55) who has given forty years of close study to the tribes of West Africa, has a very illuminating discussion of the meaning of soul among these people. He divides the reports which he has received from the natives into four groups.

"1. Ordinarily, the native will say in effect, 'I am one, and my soul is myself. When I die, it goes out somewhere else.' 2. Others will say, 'I have two things,—one is the thing which becomes a spirit when I die, the other is the spirit of the body and dies with it.' But it has frequently happened that even intelligent natives, standing by me at the side of a dying person, have said to me, 'He is dead.' The patient was indeed unconscious, lying stiff, not seeing, speaking, eating, or apparently feeling; yet there was slight heart-beat. I would point out to the relatives these evidences of life. But they said: 'No, he is dead. His spirit is gone, he does not see nor feel; that slight movement is only the spirit of the body shaking itself. It is not a person, it is not our relative; *he* is dead.' . . . Such attempts to distinguish between soul-life and body-life has not infrequently led to premature burial. . . . 3. Another set of witnesses will say that, besides the personal soul and the soul of the body, there is a third entity in the human unit, namely, a dream-soul. . . . 4. A fourth entity is vaguely spoken of by some as a component part of the human personality by others as separate but closely associated from birth to death, and called life-spirit. . . . Others speak of this vague life-spirit as the 'heart.' . . . The natives believe that by witchcraft a person in health can be deprived of his life-soul, or 'heart;' that he will then sicken; that the wizard or witch feasts in his or her magic orgy on this 'heart,' and that the person will die if that heart is not returned to him."

Here we certainly see the soul as different from the dream-double as it is from the mere phenomenon of living. The fourth entity seems to us suggestive of some of the ways in which mana is found to be used. It reminds one of the itonga that Kidd reports. Significant is it that it is this that the magician desires when dealing with a person.

Ellis (18:155) tells us that the tribes of the Gold Coast of Africa have a belief in two individualities—the living man and the tenanting *kra*. When the man dies the first of these becomes the ghost while the latter becomes a *sisa,* and is then born again. *Sisa* in this way seems comparable to *itonga.* Talbot (70:139) states that the West African believes that the body and soul are entirely different; that the soul is the real man and cannot be destroyed, while the body is something different and inferior, and temporary, and rots away when no longer needed. Junod (42:Vol I:339) tells us that the Thonga locate different psychic qualities in different parts of the body, such as patience in the liver, etc.—"Yet they certainly believe in an independent psychic principle, in a soul."

Similarly we have reports from Australasia that show that a distinction is made between consciousness and mere living. In Motlav, Codrington (8:250) states that the word for soul is *talegi* and it is believed that a ghost can take the *talegi* away from a man and "the man just lies breathing in his chest." Brown (4:193) upon asking the natives of New Britain why

the soul survived the body received the reply, "Because it is different, it is not the same nature at all." This difference is shown also by the belief among these peoples that when a man recovers from a faint or from unconsciousness it is due to the fact that his soul was refused entrance into the other world and was driven back. The man was observed to be alive but his soul or consciousness was gone. Seligmann (66:185) reports that when a man among the South West Koita people falls down unconscious on the road it is because a *tabu* has taken his *sua* (soul). The *barom* (66:734) among the North Massim people was thought to leave the body without death ensuing. A man who lay motionless and scarcely breathing for seven days was thought to have been without his *barom,* which during this time visited the upper world. Among the Mafulu Mountain people (78:266) it is thought that man has "a mysterious ghostly self in addition to his bodily and conscious self." It is hard to know just what is meant by this as Williamson does not tell us what a bodily conscious self is. Best (1:103) states that *toira* (soul) "represents the spiritual and intellectual welfare of the genus homo; while his physical health or welfare is described by the common term *ora.*" These quotations show explicitly that soul does not mean mere living.

As to the soul being the same thing as the shadow we give the following representative quotations. Junod in speaking of the Thonga people says (42:Vol. 1:339) that they do not fear to tread on the shadow. "It may even be questioned if they identify the material shadow with the *shitjhuti,* the spiritual part of man which separates from his body at death." Dennett (13:79) who has done a great deal of excellent work among the tribes of South Africa says that when you read a report which says that the same word means breath, shadow, ghost, soul,—you may be sure that the observer has misunderstood the native's thought. "The Bakulu, or souls, of the Bavili have nothing to do with shadows." Routledge (64:240) states that the soul does not depart during dreams or trances for it is the soul that gives a man his individuality, will, ego. Leonard too (49:139) says that it is the soul that gives a man intelligence. Surely soul and shadow are not here synonymous.

Similarly in Australasia we find statements by reporters that souls and shadows are not the same. Codrington (8:250) mentions a belief that a spirit could lay hold of a man by means of his shadow . . . "the shadow being in a way another person or man. But that the shadow was the soul

was never thought." Seligmann (66:189) reports that among the South West Koita people of British New Guinea the words for soul and shadow are entirely different—*sua* for soul and *laulau* for shadow. Nowadays this latter word is applied to photographs and images seen in mirrors. Among the Roro-speaking tribes he finds a similar difference—*auba* for reflection, *oriorena* for shadow, and *tsirava* for (66:309) "the vital forces or essence within an individual precisely as the Koita use the term *sua*." Sometimes the word *tsirava* is used for spirit, although *beriwa* is generally used to mean spirit. Among the South Massim peoples at Tubetube *yaruyarua* was soul and *kwanukwanuna* was shadow. At Bartle Bay however *aru* was reported to mean both soul and shadow. Keyser[10] states that the Kai people of German New Guinea have an idea of soul which is more inclusive than ours in that it included the shadow as a part of it. The soul in fact for these people pervades the body as does warmth. The Kai believe in two souls—that which survives after death, resembling man on earth except in body—and the other is the spiritual essence or soul stuff, which pervades the body as sap does a tree.

In regard to the Fiji Islands there has been some little discussion about the meaning of *yalo*, which was supposed (77: vol. I:24) to be the word for soul and yet to mean shadow. Fison (reported by Frazer[11] from a letter of Fison's) thinks this a misapprehension because *yalo* means soul while *yaloyalo* means shadow. Thompson (72:354) writes, "It is difficult to say precisely what the Fijian believes to be the essence of the immortal part of man." The word *yalo* has the following meanings: yalo (with pronoun suffixed) means mind; *yalo* with the possessive pronoun separate means shade or spirit; *yaloyalo* means shadow. "From the possessive pronoun being suffixed we may gather that the mind was regarded as being as intimately connected with a man's body as his arm, but that the spirit could be detached from it. . . . The question of the material of the ghost was as much vexed as it is in English ghost stories."

Let us now consider some of the statements about the great force mana—let us see what relation we can find between beliefs in regard to this power and in regard to the soul. We have seen that mana belongs to the spiritual side of man and can only be originated by personal beings. We have seen that in Melanesia those who during life have had mana

[10] See (25:268).
[11] See (25:411 seq.).

become powerful spirits, tebarans, when they die. Now what indications are there that there is among the African tribes a belief in such a power? In looking for evidences of such a belief it will be well to bear in mind that for many years it was reported that the Indians believed in a Great Spirit, an All-Father, but that later more scientific, if not more careful, work showed that the Great Spirit was really a great force.

We find an exactly comparable state of affairs among the Masai in Africa in regard to the beliefs about *Ngai*. *Ngai* for many years was supposed to be a supreme God, a great spirit. But Hinde (34:108) reports that the Masai have an idea of Ngai as "the Unknown" and Ngai "embodied their apprehension of power beyond the human faculties of coping with. Thunderstorms, rains, the telegraph, a railway engine are all referred to as Ngai and the word represents the incomprehensible, of which they are vaguely conscious. . . . In a case of accidental homicide or injury it is regarded as the "will of Ngai." Routledge (64:226) in describing Ngai among the East African writes, "The being thus described is not visible to the naked eye . . . the sun, moon, lightning and rain are all in a sense worshipped as manifestations of the great Power, a conception apparently not dissimilar to that of the poet when he sings of the One

'Whose robe is the light, Whose canopy space.'

The prayer of the medicine-man when he invoked divine aid is addressed to God, the sun of Kenija as 'all the same thing.'"

Livingstone reported that natives of Central Africa believed in the existence of a supreme being called Mpambe and also Morungo (Mulunga) but that Mulunga means a supreme being is questionable in the light of Hetherwick's observations. Hetherwick (32:91-94) reports that the Yaos of the Lake Nyassa region, as well as a large number of other Central African tribes, believed in a great God, Mulunga. Mulunga, Hetherwick states, is impersonal although he finds such statements as that God made the world, man and animals, hard to reconcile with the impersonal idea. Now among these people *lisoka* is the word that means soul, spirit, shade and was both personal and impersonal. Lisoka moreover *becomes* mulunga at death and is then an object of veneration. Mulunga is a term that is not, however, reserved for the soul after death but is applied to anything mysterious. "It's Mulunga," they cry when the unusual happens. Also when a man is especially lucky he says, "It's my Mulunga." Hetherwick in his description of Mulunga seems to agree with Miss Werner who describes Mulunga as (76:55) "the great spirit of all men, a

spirit formed by adding all the departed spirits together." Hetherwick also states that Mulunga is the aggregate of human dead souls but not personified. "It is to him (the Yao) more of a quality or faculty of the human nature whose significance he has extended so as to embrace the whole spirit world." Miss Werner however reports that not the whole of the soul lives on but only a part, the lisoka. Surely in this report of Mulunga we see more than an impersonal god. Mulunga is that which accomplishes the extraordinary, just as mana and wakanda do. It is that which runs through the whole spirit world. Only a part of the soul lives on and thus becomes venerated. This belief in a part of the soul as living on seems to be quite common in Africa and seems to be comparable to the belief in Melanesia that it is a certain part of the soul or certain souls that live on to be *tebarans,* the most powerful spirits.

From a study of the tribes of South Nigeria, Talbot gives us very interesting observations and suggestions. Among the Ekoi the term for supreme God is *Obassi* and among the Beni it is *Osa. Osa,* however, among the neighboring Yoruba tribes is the generic term for "*juju*" and thus Talbot seems to suggest the possibility of a relationship between "*juju*" and Great God. In regard to "*juju*" Talbot writes that it is a very hard term to translate or understand, though it has generally been defined as "spirits which are present in things." This hardly covers all the usages that he finds as for instance it would not properly describe the Ekoi *Njomm,* which Talbot says can only be translated as "*juju,*" and which seems to include all incomprehensible mysterious force, the lowest form of which he compares to the "Melanesian mana." This report is merely suggestive of what the relation between a great god and such a power as mana may be, but it is sufficient to indicate a rich field for future study. If "*juju*" should turn out to express a belief in such a power as mana rather than in spirits it would be interesting to see if the same thing did not hold true of what is termed fetichism. Nassua (57:81) tells us that fetich is equivalent to the following native words. The native word on the Liberian coast is "*gree-gree;*" in the Niger Delta, "*juju;*" in Gabun county, "*mondi;*" among the cannibal Fang, "*bian.*" If all of these concepts should turn out to be powers like mana we should have a very fruitful field for comparative study. Pechuel-Loesche[12] thinks that magical power rather than spirits is behind fetichism.

In South Africa Junod (42:339 seq.), reports that the belief

[12] See (30:45 seq.).

among the Thonga and Ronga tribes in regard to "*Tilo*" is very hard to understand. This belief in *Tilo* is similar, he believes, to the belief in a Supreme Being found among all the Bantu peoples, a God known under the name of Nzame among the Fan and a great number of West African tribes—Mulunga among fifteen East African tribes—Nkulunkulu in Zululand, etc. *Tilo* seems to mean Heaven but it also means great power, the power in unusual things; storms, death, convulsions, etc. Several beliefs comparable to *Tilo* we have suggested are beliefs in a power like mana—may it not be that this too will turn out to be the same?

Dennett (13:85 seq.) working for many years in South Africa states that the religion found here may best be called —Nkici-ism, and that it has the following characteristics. *Nzambi* is the great god and the literal meaning of his name is, "the personal essence of the four." Now by the "fours" is meant the group of four powers called, *Bakici Baci,* powers which are spiritual and are connected with objects regarded as sacred. They are in a way offspring or attributes of Nzambi. It is *ki-ci* that signifies that they belong to the great god—for his power is *ki-ci.* In an article later (15:261) than the book from which these statements have been taken Dennett states that the power *ci* is similar to that of mana or wakanda. An interesting feature in this group of facts is that the chief of these people has as one of his titles, Nkicici (Kici on earth). Here we see kici as the great power vested in the chief of the tribe. The socially great are those who have the most mana.

These quotations are sufficient to show that very probably Africa must be counted as one of those regions in which a belief in a great force has sprung up. Moreover we see that this power is very closely related to the spiritual part of man known as the soul. The very close relation which we find between a great power and the Supreme God, we shall consider in more detail in the next section.

As to Melanesia as we have stated Codrington reported that the belief in mana was universal—the whole of magic and religion consisted in obtaining this power. The belief he thought to be common to the whole Pacific.

Explicit statements in regard to this concept among the Polynesians are not so numerous[13] but we find it stated that *atua* among the Maori, *ane* or *hau* among the Powape, *kasinge* or *kalit* among the Pelew, *anut* among the Kusai are concepts comparable to that of mana. Featherman[14] wrote

[13] See Marett, p. 126 seq.
[14] Social History of the Races of Mankind, Vol. II, p. 207.

"The generic name of *atua* which is applied to every kind of supernatural being and mysterious objects did not convey a distinct idea of god or of divinity, . . . was a mysterious something which they could not explain, a name given to all active agencies of nature whose mode of action was incomprehensible to them. . . . The strangers that first came among them sending thunder and lightning by the discharge of the fire-arms were *atua*."

Corvan who spent his life in New Zealand states that *atua* means gods. *Mauri* seems similar to mana for as Corvan says (10:107):.

"Deep in the heart of the Maori-Polynesian was a belief that everything in nature had its *mauri* or soul-force. . . . The term *mauri* is a difficult one to explain clearly to the *pakeha*[15] mind. It can generally be translated as 'soul' but the Maori does not intend to convey the idea that animals have souls, when he speaks of their *mauri*. Again forests and cultivation-grounds have their *mauri*, the intangible quality that makes them fruitful as sources of food-supply."

Best (1:102) gives a somewhat similar report. Both Corvan and Best report a belief in one God, (*Iho*) held by these people. Statements about *Iho* however very closely resemble those that have been made about Wakanda and we must remember that for some time Wakanda was reported as God. Corvan (10: 108) writes that Iho comes from the root *iho* meaning the animating force in all things, the primal energizing principle. Best states that iho is "the vital spirit in all things."

These quotations are sufficient to impress upon us how much a careful field study is needed to show us what the interrelation of these concepts is. We certainly see an indication that the great power, whatever be its genesis, is certainly that which gives a basis for the belief in a great, supreme God.

Among the tribes of Borneo, Hose and McDougall report facts that certainly suggest a belief in a force comparable to mana. The Kayans believe in two souls, "a ghost-soul or shade . . . and on the other hand the vital principle." The Kayans believe that they are surrounded by spiritual powers—some of which have bodily form and others of which are very vaguely represented as merely a "vital principle." In regard to the Kenyans of Borneo—they write (36: vol. II, 29).

"They may be said to attribute a soul or spirit to almost every natural agent and to all living things, and they pay most attention to those that seem most capable of affecting their welfare for good or ill. They feel themselves to be surrounded on every hand by spiritual powers, which appear to them to be concentrated in these objects to which their attention is directed by practical needs; adopting a mode of expression familiar to psychologists, we may say that

[15] Foreign or uninitiated.

they have differentiated from a 'continuum' of spiritual powers a number of spiritual agents with their various degrees of definiteness. Of these the less important are very vaguely conceived. . . . The more important, assuming individualized and anthropomorphic forms and definite functions, receive proper names."

In regard to the use of the word Bali, which is applied to the Supreme God, to the messenger of this deity, to the minor deities—these writers say (36: vol. II, 29)

"The word *Bali* is used on a great number of occasions, generally as a form of address, being prefixed to the proper name or designation of the being addressed or spoken of. The being thus addressed is always one having special powers of a sort that we should call supernatural, and the prefix serves to mark this possession of power. It may be said to be an adjectival equivalent to the Mana of the Melanesians or of the Wakanda or Orenda of the North American Tribes, words which seem to connote all power other than the purely mechanical."

Kruijt[16] in writing of the animism which he finds in the Indian Archipelago states that inferior peoples go through two stages of development. First there is a sort of force scattered through all objects which make them alive and doing, this force is not yet individualized; second there are individual spirits that inhabit everything. The difference in these two outlooks is due to differences in the mentality of the social group. In the first the individual consciousness is not separated from the collective, the sentiment of participation dominates; but in the second the individual has a clear consciousness of himself as distinguished from the social group. As we have stated before we believe these two concepts may be held simultaneously, not necessarily successively.

Warneck (74) has perhaps the most complete study of a people in this group of islands. He studied the Batak people of Sumatra very carefully and finds that the soul-cult is the very core of their religion. He criticizes Kruijt's study as being too broad and too lacking in discrimination in dealing with different areas. The important thing in the religion of the Batak is the rôle of the soul-idea—*tondi,* a "life-strength, life-material, or soul-stuff." The description of this *tondi* is very akin to that of mana as several writers have suggested. Warneck states that this idea besets the mind and dominates the practises of the Batak. It is what gives efficacy to the gens and to all things. It radiates in the chiefs and in the powerful. It determines the fortune, rank, moral character of the individual. It comes from the "stock" of souls in the over-world. This belief reminds us of a similar one which

[16] See L'Année Sociologique, Vol. XII, pp. 273-275.

Durkheim stresses in Australia as very important for his theory of the totemic principle, and hence mana, as being social. Although the *tondi* is the *soul-stuff*, on the other hand it is the *roha* that determines a man's personal consciousness, his I. But that the *tondi* is spiritual is shown by the fact that the different functions of the *roha* depend upon the *tondi*, often the will of the *tondi* and that of the *roha* are in conflict.

This report may seem hard to interpret and doubtless it is. With our constantly-present preconceptions of what the primitive should believe—our commonly accepted belief that Tylorian animism covers the primitive's religion—it has been hard to get the primitive's real thought recorded. We cannot help seeing however that the primitive idea of the "soul" includes a power which is very widespread among the other parts of the universe.

To sum up then, from a consideration of this data we cannot but believe that the concept of such a force as mana has played a large part in the life of primitive man. Primitive man as well as modern man felt a scale of values in his life. Some things are more powerful and more to be desired than other things. Some things and events give the impression of being extraordinary. The question naturally arises, "What is it that causes these extraordinary events? An answer to this question becomes possible when man has *experienced* a power great enough to do extraordinary things. When is this power experienced? From a study of the great rôle of the social among primitive peoples it seems to us that only one answer is possible—it is the feeling of the social. When one sees the leading rôle that social activities have played among primitive peoples one would expect some influence coming from the consciousness of heightened power which is always experienced in a live group activity. And that we do see it, we believe to be shown by the extended rôle which the concept of *mana* plays. Mana, we believe, is the power which man experiences when he is acting with his group. Given such an explanatory principle it is bound to function to explain all extraordinary things just as we see it among the Melanesians, Africans, Indians.

VI. Is Manaism Religion?

Just as animism was very generally called religion—so too manaism has been called. But *is* manaism religion? Before we can answer this question, we must state what we understand by religion. Students of religion have approached its

psychology from two sides. One group has stressed the differentiating mark of religious phenomena as a certain specific attitude on the part of the subject toward the object or objects; while the other group has stressed the specific object or objects toward which the attitude is maintained. Most writers implicitly combine the two, that is religion is defined as a specific attitude toward a specific object—but their stress is generally upon one side or the other.

When you turn to those who stress the object toward which the attitude is held you find emphasized either the object in itself or some unseen being or force behind the object. For instance you find it stated that man's first religion is worship of stones, then trees, then animals, etc. Many writers accept Tylor's definition that religion is a belief in spiritual beings in all things surrounding man. Others contend that belief in spiritual beings is not sufficient for a religion, but that these beings must first be raised to a rank greater than man. Just how these objects happen to become raised to the rank of beings great enough to be worshipped has not been very clearly made out. For instance, Leuba, who insists that the differentiating mark of religion is the *kind* of power on which man feels dependent and from which a certain kind of behavior is elicited; states that this power is felt to be hyper-human and refuses to accept merely spiritual beings as hyper-human. The reason that certain objects come to be regarded as powerful enough for religious objects is due to the "useful" habit of man's mind "to ascribe to unseen beings without regard to their original nature, the ability to supply all the wants of the tribe and the individual. . . . It is a truly remarkable habit,—that of imagining in other beings coveted powers and virtues" (52:112). Many writers make the building up of a god a slow evolutional process. Perhaps an animistic soul has been singled out and gradually through legend or custom has attained the rank of a god. But whatever the process by which the god, power, or what not has been reached—it must be just such an object before we have religion.

For those writers who stress the psychic attitude as the important thing in religion—we find disagreement as to what this attitude is. Marett as we have seen gives as the core of religion, "supernaturalism, the attitude of mind dictated by awe of the mysterious." Some writers say the sense of the sacred gives us religion, others speak of a religious thrill, others that dependence is the psychic mark of religion. We cannot here enumerate the many states of consciousness that have been emphasized as the basal ones of religion but

we will pass on to a treatment of what we consider to be necessary in order to have a religious consciousness.

In our study of what has been termed the religious experience the following statement covers the factors involved. One feels dissatisfied with himself and makes appeal to a power whom he regards as greater than himself and whom he is confident can give aid. In speaking of this power as personal we use the term personal in the sense which we have already indicated. The question arises—How does one know that there is such a power? Perhaps, someone will contend, we have been told that there *is* such a power, but if one has no further knowledge than this, we do not believe that he can have the confidence necessary to make a truly religious appeal. One finds in reading accounts of religious experiences that they are always described in personally experienced terms. One always *experiences* God or the Power or the Universe, etc. Now before one can appeal to a greater power, we believe that he must know that this power really exists and this he can only know if he has experienced greater power. And, as we have so often said, we believe that he experiences this power in a group activity. We must remember however that to *experience* this power is not the whole of religion. In order to be religious one must feel dependent upon this power and make appeal to it. Unless a person has had help from an object he will not go to that object expecting help. Hence we must explain why man believes he can gain help from a god or other object. He believes he can gain this help because he *has* gained this help, or power. Let us look a little more in detail at the social experience in which we gain the idea of great power. In this experience we find two poles of emphasis: one the power on which the self feels dependent, and the other the power which the self owns or is. In this social activity one feels dependent upon all around him, feels a great power rushing into him from without—but also he feels that he is the one who is experiencing this power—he is the one who can now do wonderful things. During the experience these two aspects are not entirely separated but are in some fashion fused. This power which one feels at this time is not felt as simply an addition to his usual power but there is a qualitative peculiarity in it which is not present in any other experience. It causes a sense of expansion of the self, of happy acceptation of the power felt. Now having gained this idea of greater power the self when he has again sunk to the level of his usual efficiency will at times, remembering how much more powerful he was

at certain times, become dissatisfied with himself and will make appeal to what he regards as having given him this wonderful power, that he once felt. He has experienced this power and so is confident that it exists. The various objects that different peoples have appealed to for this power is to be explained by the fact that different things have attracted the attention as having power equivalent to that which the self has also experienced at certain times. This then is the reason that so many objects have functioned as religious ones. Let an object be observed to accomplish extraordinary things and it will be thought to have great power. What more natural then, than to appeal to this powerful object later when power is desired by the self. Power *has* come in from the outside before—it can come in again. Supposing a man comes back to his social group feeling dependent upon it and asking for the same wonderful power he once received from it—he is, we believe, religious. But as we have said *any* object may function in this way.

If we look at some of the classic psychological accounts of religious experience we will see that the facts quoted lend themselves very well to the interpretation which we have given. For instance let us look at James' account. For James the whole religious phenomenon can best be envisaged as that due to the "divided self." Man feels himself incomplete and there follows the experience of new-birth or the twice-born character. James writes (39:167):

"The psychological basis of the twice-born character seems to be a certain discordancy or heterogeneity in the native temperament of the subject, an incompletely unified moral and intellectual constitution."

James goes on to point out that in all of us, proportionately to our sensitiveness, there is a chaos of higher and lower feelings which for character to evolve must be straightened out and unified in the inner self. Unhappiness and sense of incompleteness result during the reconstruction. One must feel himself incomplete and must surrender himself before he will experience the phenomenon of religion—if he has done this he will be rewarded by having the Holy Spirit rush into him. James writes (39:211): "One may say that the whole development of Christianity in inwardness has consisted in little more than the greater and greater emphasis attached to this crisis of self-surrender." If the self succeeds in surrendering and experences the second birth he will notice the following things about his religious consciousness. He will feel that he is

of a wider life than that of this world's little selfish interests; will feel convinced of the existence of an Ideal Power; will feel a sense of the friendly continuity of the ideal power with his own life and a willing self-surrender to its control; will feel an immense elation and freedom as the outlines of the confusing selfhood melt down; will feel a shifting of the emotional centre towards loving and harmonious affections.

Now this greater power of whose existence we must be convinced James believes to be truly existent and moreover existent as the sub-liminal self. It is here that "motives deposited by the experiences of life" "incubate" and "when ripe the results hatch out, or burst into flower," in such experiences as conversions, etc. James thinks that psychology has proved that the subconscious does thus break over into the ordinary fields of consciousness. In such incursions we feel ourselves in relation to a "More" and (39:512):

> "The 'More' with which we feel ourselves connected is . . . the subconscious continuation of our conscious life. . . . In the religious life control is felt as 'higher;' but since on our hypothesis it is primarily the higher faculties of our hidden mind which are controlling, the sense of union with the power beyond us is a sense of something, not merely apparently, but literally true." James seems to be well satisfied with this hypothesis for he says (39:512) "Starting thus with a recognized psychological fact as our basis we seem to preserve a contact with 'science' which the ordinary theologian lacks."

All of the marks which James gives of the religious consciousness do indeed seem to be present, but in the *interpretation* of these marks we differ from James. James himself criticizes his own theory in the very way in which we should if our own theory is to stand. He writes (38:509): "The practical difficulties are: 1, to 'realize the reality' of one's high part; 2, to identify oneself with it exclusively; 3, to identify it with the rest of ideal being." We believe that our theory answers these three questions. Man realizes the reality of his higher part from experiences which he as normal human being is bound to have, namely a social activity experience. This higher self for us means more efficient, more powerful self and must not be confused with the term higher self as it is used in ethics. By the latter one means the self using its energies to accomplish certain specific ends *judged* more worthy. Again our theory explains why man identifies himself with this power by showing that he cannot help identifying himself with it because he finds himself *being* this power. Moreover since this power is experienced when all around are experiencing, when, as Durkheim has pointed

out, one is first experiencing unity—he necessarily identifies himself "with the all of ideal being."

James thinks that the sense of incompleteness comes to man because he is a being containing a chaos of higher and lower feelings—but what can this mean other than that man experiences different complexes of consciousness under different situations. We are not born with a mass of separate feelings *labeled* higher or lower, only in so far as these feelings are carried into action and accomplish different results can they be called higher and lower. And this is just what our theory explains. When certain conscious states occur it is when we are experiencing ourselves as selves of a certain efficiency and when others occur we are experiencing ourselves as of other efficiencies. If there is a difference of efficiencies of these two selves then we have ground for comparison and when the self feels incomplete due to the fact that he has before felt more complete he will try to put himself in a position in which he has before felt more complete. We cannot believe that a man says, "Now I shall relax, now surrender myself" and straightway the Spirit rushes in. He does not do this unless he has experienced the Spirit rushing in and felt its benefits. Men or even dogs do not stand expectantly before windows which have never thrown them crumbs. We are just as anxious as James to preserve contact with science and we believe that we have shown a natural empirical experience in which all the factors necessary for a religious experience are found.

Our theory is like Durkheim's in that we make the contrast of the social and the individual self the basis on which religion is built up,—but whereas he makes everything connected with the social—sacred, and hence religious—we would include within a religious complex only those objects which are regarded as capable of giving help; the judgment of this capability depending upon observations of what these objects can do. Sacred, i.e., social, does not make religious—it is supplication that does this. Moreover we differ from Durkheim in regarding the power which makes the object capable of being a religious object—a personal and not an impersonal one. Our theory agrees with animism in holding that the soul is the important thing in religion but it is the soul or self that is experienced as very efficient that is anthropomorphised to become a god.

In all of this we see simply an ejection of a little drama within a person's own mental life. The functioning, experiencing side is we believe the same in all persons. Man due

to his very make-up will by social contact of his immediate family gain some idea of himself.[17] The idea of this self or soul then serves as explanatory category of things that seem of equal power. Then as a social being man is bound to take part in a larger group activity,—be it his own family, with himself as member of course, pitted against his neighbor; his school against another school—or even acting as a whole; his tribe gathering for a sun-dance, or a tribal initiation ceremony—and in this shared activity he receives a peculiar experience in which he feels himself a thousand-fold strengthened. This experience in turn becomes an explanatory category.[18] During this latter experience besides feeling more efficient, he feels dependent upon those around, upon the power entering him—and yet he feels that this power is like his own power—even *is* his own power and thus there arises the sense of the continuity with a great Power and also the conviction that this great Power can help him.

Such an explanation of religion takes into account those primitive forms of religion which are based upon securing power *as* power, i.e., mana: and also those historical religions which have to do with a great Power, but a power vested in a God.

VII. Is Manaism Magic?

In the space of this article we can only give a few indications of the way in which we believe mana to be related to magic. As we have seen, mana has been made by Hubert and Mauss the force which is at the bottom of all magical practises, and since we believe this to be true—let us see how magic will connect with our attempted psychological analysis of the state of consciousness that gives rise to the idea of mana.

Generally, following the lead of Frazer, the acts called magical have been classed as those of imitation or sympathy and those of contagion or contiguity. In the former we have acts in which a *representation* is given of what is desired to take place, for example the act of pouring water in order to make the rain fall: while in the latter the principle of contact is used in order to make that which is desired

[17] The manner in which this idea is built up has been worked out very adequately by Royce and by Baldwin.

[18] It must be remembered that by explanatory, we do not necessarily mean rational in the sense of "intellectual" conception—but rather the primitive "functions," in an affective or motor way, his explanation. He *acts* toward things *as if* they contained certain power like that he has experienced.

take place, as when a man obtains the hair of his enemy so that by torturing the hair the torture will effect the one to whom the hair belongs. Hubert and Mauss criticize this explanation of magic, pointing out that by the principle of contagion *all* things that are near the contagious object would be affected, not merely as in truth is the case, the one that is *intended* to be affected. Moreover all the qualities in the contagious object are not transferred, only those *intended*. Again, consider the fact that the current of this transfer may be interrupted. The transferred quality may be *directed*, as for instance the malady of the eye is sent to the *eye* of the lizard rather than to any other part. Thus the important things in magic, according to these writers, are—the abstraction of certain qualities, the exclusive fixing of attention upon certain things, and the direction of the intention. Similarly imitation is criticized as a working principle in magic. These writers divide all magical practices into manual and oral but state that even in the apparently manual practices really it is the intention of the magician that is important.

Marett states a similar view in saying that the "spell" is the heart of the magical affair—the "spell" really being an imperative willing. It seems then that there is now a tendency to interpret magical practises as those in which imperative willing comes into play. Mana, a great power, is necessary to accomplish the desired results. But mana is a power given rise to by social activity and is a power which every man is bound to experience. Why then is it that only certain persons are magicians? We have seen that in the experience that gives rise to the consciousness of mana there are two poles of emphasis: one on the externality of the power and one on the internality of the power. When the former pole is emphasized we have the basis for religion and when the latter we have the basis for magic. Who then will be the magician? He who during this experience of social consciousness is thought because of his actions to be the one having the most of this power—mana. It has often been pointed out that the primitive magician is the one who is of a nervous disposition, who is perhaps subject to hysterical fits. Such a person is the one who in social activities, due to lack of power of inhibition, would exhibit to the greatest extent the effect of his feeling of heightened activity. It is with this power that the magician works. That it is the power aroused by social contact with which the magician works is suggested by the fact that the magician must have a sympathizing audience with which to work in order to accomplish

his results. Another belief which indicates that the primitive realizes that the arousal of the magician's power is dependent upon action with others is that the magician must very often sojourn in the land of spirits before he can become a magician. Among the Veddas a magician is taken possession of only during public ceremonies.

As to the relation of magic and religion the discussion seems unending. We shall state only two views—that of Hubert and Mauss, (37) with whom Durkheim agrees, and that of Hartland (31). Hubert and Mauss criticize Frazer's theory in which he makes magic a matter of constraint and religion one of conciliation by saying that often the gods were constrained and that in the Intichiuma ceremonies which Frazer classifies as magic, the totems were solemnly invoked. These writers believe that the differentiating mark of religion and magic is to be found in the fact that the religious rites are those of an organized cult which take place in society and in an "open place" while the magical ones are individualistic and seek the "shades."

Hartland holds that magic depends upon the exercise of the personal orenda of the magician while religion is an effort to get the orenda of a more powerful being to accomplish the desired end. Our view of the relation of magic and religion is then the same as that of Hartland, i.e., in magic one who has found he possesses a great deal of power attempts to accomplish certain results, while in religion help is solicited from one who is thought to have a great deal of power. Hartland will not admit however that the idea of this power is aroused during social activities. He believes that the idea of this power is awakened by external nature although he grants that the consciousness of power gained in social activities may organize and intensify this power that has been conceived from watching external nature. We have already criticized the view that nature can give rise to the idea of a power, independent of man's experiencing within himself this power. Also it seems to us that Hartland does not allow room for the very common characteristic of the religious attitude whereby aid is asked for the solicitor in order that *he* may accomplish a certain end. It is not always asked in religion that a being do a certain thing because of the great power which he possesses—but he is often asked to give power to the solicitor. Confidence that such power can be attained demands a specific experience in which power *has* been gained —and this we believe to be found in the group activity experience.

In order to illustrate our position let us look a little more closely at a custom which is quite widespread among the North American Indian. This custom or rite is known among the Omaha Indians as No^{n}'zhi^{n}zho^{n}. It is a rite that takes place at puberty. Miss Fletcher and La Fleche say of No^{n}'zhi^{n}zho^{n}.(19:128 seq.). "The literal meaning of the word is 'to stand sleeping;' it here implies that during the rite the person stands as if oblivious to the outward world, conscious only of what transpires within himself, his own mind. . . . At the period when the youth is at the verge of his conscious individual life, is 'old enough to know sorrow' it was considered time that through the rite No^{n}'zhi^{n}zho^{n} he should enter into personal relations with the mysterious power that permeates and controls all nature as well as his own existence." The origin of this rite is told by the Omaha in his Sacred Legend. "The people felt themselves poor and weak. Then the old men gathered together and said: 'Let us make our children cry to Wako^{n}'da that he may give us strength.' The old men said to the youth, 'You shall go forth to cry to Wako^{n}'da.'" In explanation of this rite the Omaha said, "The appeal was for help throughout life. As the youth goes forth to fast he thinks of a happy life, good health, success in hunting." In preparation the youth was taught the following prayer. "Wako^{n}'da, the permeating life of nature and man, the great mysterious power; here, poor, needy, he stands, and I am he. Here, poor, needy he stands, and I am he." This prayer was called Wako^{n}'da, giko^{n} and meant, "to weep from the want of something not possessed, from the conscious insufficiency and the desire for something that could bring happiness and prosperity. . . . The words of the prayer set forth the belief that Wako^{n}'da was able to understand and to respond to the one who thus voiced his consciousness of dependence and his craving for help from a power higher than himself."

In this rite we see an explicit recognition that man must feel dependent upon the great power and must ask it for aid. The suppliant is not asking Wakonda to do certain things but to give him aid in order that he may be powerful.

A criticism which has often been made of the social explanation of religion may be considered at this point. It is said that such a theory leaves no room for the rôle of the individual often seen in religions and one points to the Messianic religions of the North American Indians as a case in point, stating that here we surely see the tribe borrowing from the individual. This may be true but, we believe, that

a reading of these very religions will show that the Messiah gained his ideas from some social communion—very often from "sojourning in the land of spirits." The rite of No^{n}'zhi^{n}-zho^{n} has also been cited against the social origin of religion—for here, it is said, we see the Indian boy receiving his religion while in the mountains alone. But as we have seen, the Indian boy goes out with a firm belief that he will thus be put into communion with Wakonda, the permeating life of all. We would suggest that the individual reformer in religion is the one who has very well developed within him the sense of the "oneness of all things." We cannot work out this thesis here but can only say that the lives of such reformers give us this suggestion.

To sum up then our position in regard to these facts we would say that when a man has once experienced mana he may emphasize either the fact that this power came from the outside and that hence he was dependent upon it for his efficacy, or he may emphasize the fact that he is the one who is experiencing this power—he is the owner and therefore a great man. If he feels the former emphasis he is more apt to appeal in after times to an object which he believes can give him this power again, and thus he would be religious. But if he feels that it is he that is great—especially if the group from watching his feats agrees in this judgment—then he is apt to try to use this power to accomplish unusual things and is thus magical. As to the relation of constraint and conciliation in magic and religion we believe that constraint upon a god may be attempted by a magician just because he is so filled with the idea of his own ability to do great things but so long as it is constraint we are in the midst of magic, not of religion. The religious object on the other hand must be invoked and if this takes place toward the Australian totems then we are in the midst of religion and not of totemism. We cannot constrain in religion because the psychological mark of the religious consciousness is that of dependence upon a power regarded as greater. We cannot conciliate in magic because the psychological mark of magic is that of consciousness of great power as owned. That *systems* of religion and magic are closely intertwined in both primitive and modern religions and magics we cannot deny but the psychological root of the two always remains separate.

Manaism then is neither religion nor magic—it is rather, one might say, a fundamental psychological experience. It is merely the experiencing of great power in, we believe, a social activity. It may become the explanatory basis of almost any

sort of experience. Mana power may be invested in *any* object—the object determined by the particular environment in which it is placed. As we have so often pointed out the whole thing is an ejection of our own conscious life in which experiences of differing intensity and quality give us the basis for comparative explanatory principles.

VIII. Conclusion

1. There is evidence from all parts of the world that animism, in the Tylorian sense, does not form an adequate basis for primitive man's early reaction to his environment.
2. There are groups of customs and beliefs in this early society that justify the use of some such term as manaism to represent them.
3. Manaism as well as animism results from the tendency of the human mind to interpret things in terms of its own inner experience.
4. Animism is "reading into" things the individual self and manaism is "reading into" things the social self. (Individual and social self used in the sense we have explained.)
5. There is no justification for calling mana an impersonal force.
6. The question of the relative priority of animism and manaism is irrelevant.
7. Mana experienced within the self and then ejected into an object (a fact which shows that the object is regarded as greater than the individual self) and which in turn is supplicated for aid, forms what is known as religion.
8. Mana experienced within the self and then stressed as the part of the self which makes it capable of effecting things beyond the usual power of man gives rise to practices known as magical.
9. Religion is not a specific objective content, but rather an attitude toward, an appeal for, power which has once before been experienced.
10. Different objective *content* with which experience is knit up forms the difference between primitive and modern man. There is no difference in the reacting, the functional side.

Bibliography

1. Best, Elsdon. Maori Religion: The Cult of Io, the Concept of a Supreme Deity, as evolved by the Ancestors of the Polynesians. Man, Vol. 13, 1913, 98-103.
2. Boas, Franz. The Mythologies of the Indian. *International Quarterly*, Vol. 11, 1905, 327-342.

3. BRINTON, DANIEL G. Religions of Primitive Peoples. New York, G. P. Putnams Sons, 1898. 264 pp.
4. BROWN, GEORGE. Melanesians and Polynesians. New York, Macmillan, 1910. 451 pp.
5. CALKINS, MARY WHITON. The Idealist to the Realist. *Jour. of Psy. Phil. and Scientific Methods,* Vol. 8, 1911, 449-458.
6. CLAUS, HEINRICH. Die Wagogo. Leipzig, Tuebner, 1911. 72 pp.
7. CLODD, E. Animism. London, Archibald Constable and Co., 1905. 100 pp.
8. CODRINGTON, R. H. The Melanesians. Oxford, Clarendon Press, 1891. 411 pp.
9. CORNFORD, FRANCIS M. From Religion to Philosophy. London, Edward Arnold, 1912. 276 pp.
10. CORVAN, JAMES. The Maoris of New Zealand. London, Whitcombe and Torubs, 1910. 356 pp.
11. CUSHING, F. H. Zuni Folk Tales. New York, G. P. Putnams Sons, 1901. xvii-474 pp.
12. CUSHING, FRANK H. Zuni Fetiches. Second Annual Report Bureau Ethn., 1880-1881, 9-45.
13. DENNETT, R. E. At the Back of the Black Man's Mind. New York, Macmillan, 1906. 288 pp.
14. —— ——. Nigerian Studies. London, Macmillan, 1910. 232 pp.
15. —— ——. A Common Basis of Religion. *Jour. of the African Society,* Vol. 12, 1913, 256-275.
16. DORSEY, JAMES O. A Study of Siouan Cults. Amer. Bur. Ethn. Report, Vol. 11, 1889-1890, 351-553.
17. DURKHEIM, EMILE. Les Formes Elementaires de La Vie Religieuse. Le Systeme Totemique en Australie. Paris, Alcan, 1912. 647 pp.
18. ELLIS, A. B. Tshi-Speaking Peoples of the Gold Coast of West Africa. London, Chapman and Hall, 1887. 343 pp.
19. FLETCHER, ALICE C., and LA FLESCHE, F. The Omaha Tribe. Bur. Amer. Ethn. Wash. 27th Report, 1905-1906, 19-672.
20. FLETCHER, ALICE C. A Study of the Omaha Tribe: The Import of the Totem. Proceds. of the Amer. Assoc. for the Advancement of Science, Vol. 45-46, 1896-1897, 325-336.
21. —— ——. Wakondagi. *Amer. Anthropologist,* N. S., Vol. 14, 1912, 106-108.
22. —— ——. Notes on Certain Beliefs Concerning Will-Power among the Siouan Tribes. Science, N. S., Vol. 5, 1897, 331-334.
23. —— ——. The Hako: A Pawnee Ceremony. 22nd Report Bur. Amer. Ethn. Wash., 1900-1901, Part II. 372 pp.
24. FOWLER, W. WARDE. The religious Experience of the Roman People. New York, Macmillan, 1911. 504 pp.
25. FRAZER, J. G. The Belief in Immortality. London, Macmillan, 1913. 495 pp.
26. GOMES, EDWIN H. Seventeen Years Among the Sea Dyaks of Borneo. London, Seeley and Co., 1911. 343 pp.
27. HADDON, ALFRED C. Magic and Religion. Reports of the Cambridge Anthropological Expedition to Torres Straits. Vol. 5, 320-378. Cambridge, University Press, 1904.
28. —— ——. Head Hunters: Black and White and Brown. London, Methuen and Co., 1901. 426 pp.
29. HARRISON, JANE ELLEN. Themis: A Study of the Social Origins of Greek Religion. Cambridge, University Press, 1912. 559 pp.

30. HARTLAND, E. SIDNEY. President's Address to Section H., 1906. Report of the Brit. Assoc. for the Advancement of Science. John Murray, 1907, 675-688.
31. —— ——. Ritual and Belief. N. Y., Scribner's Sons, 1914. 352 pp.
32. HETHERWICK, ALEXANDER. Some Animistic Beliefs among the Yaos of British Central Africa. *Jour. of Anthro. Institute*, N. S., Vol. 5, 1902, 89-95.
33. HEWITT, J. N. B. Orenda and a Definition of Religion. *Amer. Anthro.*, N. S., Vol. 4, 1902, 33-46.
34. HINDE, SIDNEY L. The Last of the Masai. London, Wm. Heineman, 1901. 180 pp.
35. HOBLEY, C. W. Ethnology of A-Kamba and other East African Tribes. Cambridge, University Press, 1910. 172 pp.
36. HOSE, CHARLES and MCDOUGALL, WM. The Pagan Tribes of Borneo. London, Macmillan, 1912. 2 vols.
37. HUBERT, HENRI and MAUSS, MARCEL. Esquisse l'une Theorie Generale de la Magic. L'Année Sociologique, 1902-1903, Vol. 7, 1-146.
38. IRLE, I. Die Herero. Gütersloh. C. Bertelsmann, 1906. 352 pp.
39. JAMES, WM. Varieties of Religious Experience. New York, Longmans, 1902. 534 pp.
40. JENKS, ALBERT E. The Bontoc Igorot. Manila, Bureau of Public Printing, 1905. 266 pp.
41. JONES, WM. The Algonkin Manitou. *Jour. of Amer. Folk-lore*, Vol. 18, 1906, 183-190.
42. JUNOD, HENRI A. The Life of a South African Tribe. London, Macmillan, 1913. 2 vols.
43. KIDD, DUDLEY. Savage Childhood, A Study of Kaffir Children. London, Adam and Chas. Black, 1906. 314 pp.
44. KING, JAMES H. The Supernatural, its Origin, Nature, and Evolution. New York, 1892. 2 vols.
45. KING, IRVING. The Development of Religion. New York, Macmillan, 1910. 371 pp.
46. KINGSLEY, MARY H. West African Studies. London, Macmillan, 1899. 639 pp.
47. KITCHING, A. L. On the Back Waters of the Nile, Studies of Some Child Races of Central Africa. London, Fischer Unwin, 1912. 295 pp.
48. L'ANNÉE SOCIOLOGIQUE. Publice sous la direction de Emile Durkheim. Paris, Felix Alcon, Vols. I-XII.
49. LEONARD, ARTHUR GLYN. The Lower Niger and its Tribes. London, Macmillan, 1906. 564 pp.
50. LEVY-BRUHL, L. Les Fonctions mentales dans les societes inferieures. Paris, Alcan, 1910. 461 pp.
51. LOVEJOY, ARTHUR O. Fundamental Concept of the Primitive Philosophy. Monist, Vol. 16, 1906, 357-383.
52. LEUBA, JAMES H. A Psychological Study of Religion. New York, Macmillan, 1912. 367 pp.
53. MAASS, ALFRED. Bei liebenswürdigen Wilden, Ein Beitrag zur Kenntnis der Mentawai-Insulaner, besonders der Eingeboren von si Oban auf Sud Pora oder tobo lagar. Berlin, Wilhelm Süsserott, 1902. 256 pp.
54. MARETT, R. R. The Threshold of Religion. London, Methuen and Co., 1909. 173 pp.
55. MCGEE, W. J. The Siouan Indians: A Preliminary Sketch. 15th Report *Bur. Amer. Ethn.*, Vol. 15, 1893-1894, 153-244.

56. MURRAY, G. GILBERT. Four Stages of Greek Religion. New York, Columbia Press, 1912. 223 pp.
57. NASSUA, R. H. Fetichism in West Africa. London, Duckworth, 1904. 389 pp.
58. NEUHAUSS, R. Deutsch Neu-Guinea. Berlin, D. Reunier, 1910. 3 vols.
59. PARTRIDGE, CHAS. Cross River Natives, Being Some Notes on the Primitive Pagans of Obubura Hill District South Nigeria. London, Hutchinson and Co., 1905. 332 pp.
60. PRATT, A. Two Years among New Guineau Cannibals. London, Seeley, 1906. 359 pp.
61. PREUSS, C. TH. Der Ursprung der Religionem und Kunst. Globus, Vols. 86, 87, 1904-1905.
62. RADIN, PAUL. Religion of the North American Indians. *Jour. Amer. Folklore*, Vol. 27, 1914, 335-373.
63. ROSCOE, JOHN. The Baganda, An Account of their Native Customs and Beliefs. London, Macmillan, 1911. 547 pp.
64. ROUTLEDGE, W. Scoresby and Katherine. With a Prehistoric People, The Akikuya of British East Africa. London, Edward Arnold, 1910. 392 pp.
65. SCHMIDT, P. G. L'Origine de l'Idee de Dieu. Anthropos. Series of articles. Vols. 3, 4, 5, 1908-1909-1910.
66. SELIGMANN, C. G. The Melanesians of British New Guinea. Cambridge, University Press, 1910. 766 pp.
67. SKEAT, WALTER WM. and BLAGDEN, CHAS. OTTO. Pagan Races of the Malay Peninsula. London, Macmillan, 1906. 855 pp.
68. SPENCER, BALDWIN and GILLEN, T. J. The Native Tribes of Central Australia. London, Macmillan, 1899. 671 pp.
69. SPIETH, JAKOB. Die Ewe-Stamme. Berlin, D. Reimer, 1906. 962 pp.
70. TALBOT, P. AMAURY. In the Shadow of the Bush. New York, Geo. H. Doran Co. 500 pp.
71. THOMAS, NORTHCOTE W. Anthropological Report of the Edo-Speaking Peoples of Negeria. London, Hamson and Sons, 1910. 2 vols.
72. THOMSON, BASIL H. Kalou-Vu (Ancestor-Gods) of the Fijians. *Jour. of the Anthro. Institute*, Vol. 24, 1895, 340-359.
73. TYLOR, EDWARD BURNETT. Primitive Culture. New York, Henry Holt Co., 1888. 3rd Ed. from the Wnd. Eng. Ed. 2 vols.
74. WARNECK, JOH. Die Religion der Batak. Leipzig, Religionsurkunden der Völker, IV. 1, Dietrich, 1909. 136 pp.
75. WEEKS, JOHN H. Among Congo Cannibals. London, Seeley and Service, 1913. 352 pp.
76. WERNER, A. The Natives of British Central Africa. London, Archibald Constable, 1906. 303 pp.
77. WILLIAMS, THOMAS. Fiji and Fijians. London, Alexander Heylin, 1858. 2 vols.
78. WILLIAMSON, ROBERT W. The Mafulu Mountain People of British New Guinea. London, Macmillan, 1912. 364 pp.
79. WISSLER, CLARK. The Whirlwind and the Elk in the Mythology of the Dakota. *Jour. of Amer. Folk-lore*, Vol. 18, 1905. 257-268.
80. WUNDT, WILHELM. Elemente der Völkerpsychologie. Leipzig, Alfred Kröner, 1912. 523 pp.

FRENCH ORIGINS OF AMERICAN TRANSCENDENTALISM

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The writer wishes to apologize for the personal character of the following introductory remarks. At the outbreak of the European war, he was struck by the deliberate attitude, on the part of an overwhelming majority of the intellectual Americans, favorable to the English and the French, and unsympathetic to the German cause. He soon came to the conclusion that we had been laboring for years under some misapprehension; that if the letter spelled German philosophy, German science, German thought, the spirit of the nation had not been very deeply affected. Casual remarks which he had made in the past and which had a bearing on the question came back to his mind; and his curiosity once aroused, he found himself confronted day after day, as if by mere chance, with more and more facts,—all pointing to the same conclusion: German action on American thought was not by any means so great as it was represented to be; French action, on the other hand, had been considerably underestimated. He decided to call on the scholarship of his colleagues, wondering whether they would not, after reflection, feel as he did. With this purpose in view he grouped some of the most interesting data he had collected; and at the meeting of the Modern Language Association in Princeton, at Christmas time, he presented a paper: *Notes on an Unexplored Field of Research, the Relation of French and American Thought in the Eighteenth and Nineteenth Century.*

He had some new information regarding the extent of French reading in the days of the Revolution; he had noted several instances of the serious part played by French educators like Fénelon and Rollin, from the time of Franklin to the time of Emerson; he had tried to visualize with some precision the efforts of Jefferson in the domain of education,—every one of them was inspired by Frenchmen,—and he found them well worth further investigation; he recalled the acknowledged debt of Alexander Hamilton, the Federalist, to Montesquieu. But he must admit that he was especially surprised at the result of his rapid survey of the field with regard to

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the German action on American thought in the first half of the nineteenth century; a complete misrepresentation of what had really taken place was evident; just merely possible interpretations of events had become generally accepted as dogmas which no one any longer dreamed of questioning; for instance, even the best and most recent scholars never traced the *German* influence on American thought any further back than *English* writers like Coleridge or Carlyle, or *French* writers like Madame de Staël or Victor Cousin—taking *a priori* for granted the remarkable theory that American thinkers would naturally have borrowed the *German* elements from English and French writers. Or elsewhere vague statements had been converted into positive misstatements; for instance, the so-called Göttingen movement assumed extraordinary proportions; Faust, in his *German Elements in the United States* transforms into "several hundreds," the about 65 students at Göttingen, or the about 125 of which we have a record for all Germany from 1815 to 1850; and the same Faust quietly calls some obscure Emerson studying in Göttingen, *Ralph Waldo Emerson*. Finally extracts were produced to show that Emerson and Whitman, who were claimed as particularly representing the influence of German thought in America, had explicitly repudiated German thought, while the spirit of their works did by no means betray traces of German philosophy.[1]

Professor Lanson, who attended the meeting, spoke of the importance of such investigations and of the spirit in which they ought to be made; but as other papers were to be presented there was no further discussion then and there. Many, however, approached the writer in the days following; they either had already under way some investigation, or they proposed to take up some; others mentioned fields which they knew would be promising. It seemed evident that the paper had simply echoed a wide-spread feeling, and one which was ripe for discussion. Finally, a few weeks later the writer received from Dr. W. Girard, of the University of California, who had heard of the Princeton meeting, a copy of a study just completed and which bears on our problem most decidedly. This thesis, written in French, is so interesting for the history of American philosophy that it deserves to be widely known and discussed. All the more so since some scholars (as happens to be known to the writer) are now exploring the same field and it might avoid duplication of effort.

[1] This article will be published shortly with additions to the original.

Dr. W. Girard, at one time student of theology in French Switzerland, had just the sort of training needed to undertake such an investigation. He approached his task with no passion; there are no snappy words, no brilliant displays of eloquence; often long involved sentences render the reading rather difficult; but the result is a complete smashing of the traditional theory (held even by the most modern scholars like Frothingham, Kiley, Goddard, Van Becelaere) of the great influence of German thought in America during the golden age of American philosophy and literature.

The complete title of Dr. Girard's book is, *Du Transcendentalisme Considéré Essentiellement dans sa Définition et ses Origines Françaises* (University of California Press, 1916, 145 pages).

By *Transcendentalism* Girard means the American philosophy which reached its full development about 1840. He calls it "the Puritan form of Romanticism."

Ever since the end of the seventeenth century signs of discontent became manifest against dogmatic fanaticism; and Jonathan Edwards endeavored to give a philosophical basis to the austere calvinistic theology. This made things both better (because dogmas were made to look more reasonable), and worse (because it seemed to strengthen a very gloomy view of life). The English and French deism, combined with the usual natural moralism, and which led to a decidedly less ascetic philosophy of life, found an echo in Samuel Johnson's *Elementa Philosophica* (1752), in Franklin, not to speak of Jefferson and Paine. But now, fear of the consequences involved in an agnostic attitude towards the meaning of life, caused the pendulum to swing back again, to Neo-Edwardism (Th. Clapp, and Timothy Dwight), and to Scotch philosophy (Reid)—one representing the theological, the other the philosophical reaction against Rationalism. The period of the Revolution followed, and when this was over, Calvinism with its dogmas of negation of free will, and of predestination, Scotch philosophy (with D. Stewart), and radical rationalism, were again struggling against each other.

Then it was that Americans felt that they must start anew. They looked for a philosophy which would be more cheerful than Calvinism, more inspiring than a philosophy of mere bourgeois common-sense, and also a doctrine of life which would be directly accessible—no more dependent on abstract rationalistic discussions (possible only for a limited number of leisurely people anyway) than on a Revelation—because it must be of a pragmatic nature. The mere expression of these

requirements spelled the answer: the source of such a doctrine is Romanticism, which, although new representatives of it had appeared since, went back ultimately to Rousseau's Moral Conscience: "Conscience, conscience! divine instinct, immortal and celestial voice. . . . . Sure guide of a limited and ignorant being, but intelligent and free . . . . !" This was to be shaped so as to fit in with the conditions of thought in America. One sees at once already, that not only has this Transcendentalism nothing to do with German Transcendentalism (except when Pure Reason is replaced by Practical Reason—which Kant borrowed from Rousseau), but the first excludes the second: there is no room in a theory of personal conscience for a theory of knowledge such as Kant's, i.e., getting truth by way of philosophical speculation when it has been already imparted directly and as a whole, a theory leading then to the Metaphysical systems of Kant's followers. Truth will be considered again as imparted to man, immediate and whole, by divine revelation; only the revelation is not through Scriptures or Tradition, but given directly by God to each individual man.

That the whole discussion assumed a pragmatic character—chiefly theological and ethical—and only incidentally epistemological, or even metaphysical,—is clear from the definitions given at various times by American Transcendentalists. "Transcendentalism," writes Margaret Fuller, "was an assertion of the inalienable integrity of man, the immanence of Divinity, in instinct." (*Memoirs,* II, 11); "Man," wrote Channing, "may entirely trust the revelation given in human nature, in conscience, reason, love and will" (*Works,* 928). "The transcendental doctrine is the substantive, indwelling spirit of the soul, the real conscience, the religious nature, the source of the inner light, the veritable true, good, beautiful, not as perception, as contemplation, but as substance, as being" (*Dial,* III, 411). And Frothingham defines it: "Transcendentalism was a movement within the limits of liberal Christianity or Unitarianism as it was called, and had none but a religious aspect;" while Cook, discussing Emerson, says: "Transcendentalism identified morality and religion and made intuition their source" (Quoted by Girard, p. 390). The theory of knowledge, as much as there is any, is borrowed from Neo-Platonism (433-4).

Let it be well understood; Girard entirely believes that circumstances led American thinkers to Transcendentalism; that they needed no one to suggest it; and that, wherever it came

from, foreign influence was in the form of presentation; or when occasionally some new arguments were brought in, these were in support of views already held (394).

First then, that being said, what about Germany's influence? Girard finds, just as the writer had suspected, although after a much less thorough examination, that the Göttingen movement did little more in America, for several decades at any rate, than to start an interest in the German *language,* then practically unknown; but "the influence of those who, before 1830 devoted themselves to that study (of the language) is entirely foreign to the formation of Transcendentalism" (397).[1]

There was theology: "New-England," said Girard, "was remarkably well informed about theological controversies in Berlin and Jena, Göttingen and Tübingen. In 1819 they were complaining of the unfortunate influence of a system which was ruining the doctrine of inspiration" (399-400). And in the years following the return to Cambridge of Ticknor, the library of Harvard College received books from Germany, "but these books dealt not with philosophy as some might be inclined to believe, but theology, natural history, and philology" (400). Moreover, "we have excellent reasons to believe that the influence of that theology was not considerable" (401), the chief 'reason' being that towards 1835, when this whole movement came to its full development, the social side had eliminated theological considerations entirely.

As to philosophy in the strict sense of the word, the case is still clearer. Ticknor, on his return from Germany, discusses some theories of Wolf on Homer; Bancroft translates some German poetry; and Henri Hedge publishes his *Prose Writers in Germany,* twenty-five years after his return—no philosophy. And to the direct question: What must we think of the influence of Kant and his followers on Transcendentalism, Girard answers: "Directly, that influence has been zero (*nulle*); indirectly, it came about through the spreading in America, between 1820 and 1840, of the writings of Mme. de Staël and Benjamin Constant on the one hand, and of Coleridge and Carlyle on the other hand." Of this we have convincing evidence. "W. E. Channing informs us that he knows of Kant and of his successors only what he found about them in Mme. de Staël and in Coleridge. Ripley also tells us that

[1] Even that was very slow. In 1833, wrote J. F. Clarke, it would have been difficult to buy any German book in Boston excepting Goethe and Schiller; as late as 1843 I rummaged Philadelphia bookstores for German books. (Quoted by Girard, 398.)

he has read nothing by Kant and that he owes all he knows about them to English writers. Margaret Fuller admits that she understands nothing of Fichte, although she studies him in a treatise destined to simplify his doctrine. As to Orestes A. Brownson, he surprises us very much when, after comparing Pierre Leroux with German metaphysicians, he concludes: "*One could not rank very high such men as Fichte, Schelling and Hegel*" (403). The same man wrote, in 1837, in the *Christian Examiner,* these words which seem to represent the general opinion at the time about German philosophers: "We are not aware that any of them, nor that all of them have as yet given us a philosophy of man."

We come now to the part of English writers in the formation of American Transcendentalism, especially Coleridge and Carlyle. Owing partly to the question of language, this is the chief channel through which German influence could come to many; it thus came indirectly as already said, if it came at all.

Carlyle: Girard seems to us right in wondering why Frothingham, Riley, Goddard, and Van Becelaere always associate the name of Carlyle so intimately with that of Coleridge, as a medium of German thought for America. "Because the English historian was first to make his contemporaries acquainted with a literature and a philosophy which England and America had ignored before, this does not necessarily mean that what he wrote about it was to modify immediately the tendency of a philosophical thought—of a thought which moreover had been modified already in its form through the Ecclectism of a Cousin and a Jouffroy no less than through the religious idealism of Benjamin Constant; and this form it kept during all of the first part of the nineteenth century" (410). Moreover Carlyle is the author of *Sartor Resartus,* and in his *Critical and Miscellaneous Essays,* he fears not to say: "Kant's philosophy is not only an absurdity, but a wickedness and a horror; . . . his doctrine is a region of boundless baleful gloom, too cunningly broken here and there by splendors of unholy fire." And further: "Schelling's system differs widely from ours; . . . fairer might it be in us to say that we had not appreciated his truth, and therefore could not appreciate his error" (Quoted p. 411).

As to Coleridge the first question would be: Has he been the faithful interpreter of Kant, Fichte and Schelling? Girard does not answer directly on that point; but the following statements are all we need. "If one speaks of the influence of

Coleridge's writings on the religious thought of Calvinists, and even more of the orthodox Unitarians, we are inclined to believe that it was considerable enough; if, on the other hand, one thinks of their influence on those Unitarians who were called Transcendentalists, we are inclined to think that it hardly needs to be taken into account. We have good reasons for thinking so" (407). One of these reasons is that "there is no relation whatsoever between the notion of religion held by Channing, Ripley, and Theodore Parker, and the notion held by Coleridge" (408). In New England the latter was considered obscure and able to offer only little help to thinkers: "We consider him"—says for instance the *Christian Examiner,* which was on the whole very well disposed towards Coleridge—"as in possession of a treasure of valuable truth, and capable of doing a great service in the formation of manly character, on the principles of a sound philosophy. But the obscurity which has been complained of in his thoughts, is certainly to be found in his style; and that to such a degree as to make what he has hitherto written inaccessible to the great majority of readers." Elsewhere: "He has gained little else than smiles of compassion and ominous shaking of heads by his metaphysical speculations" (Quoted p. 408-9).

We now add this—also from the *Christian Examiner,*—which forms an admirable transition to our next topic: "Had it been given to him to interpret German metaphysics to his countrymen, as Mr. Cousin has interpreted them to the French nation, or had it been possible for him to have constructed a system of his own, we should not have regretted his indulgence of a passion which we must now condemn as a source of morbid dissatisfaction with received opinions, unjustified by any serious attempt to introduce others and better." While Ripley, in his *Speciments* (I, 42) remarks: "The objects at which Coleridge aims are in a great measure accomplished by the philosophy of Cousin" (Quoted p. 409).

Thus we are ready to follow Girard's demonstration that the great part in shaping the theories of American Transcendentalism belongs to French philosophers.

That Mme. de Staël's book, *De l'Allemagne,* was a most important source for the knowledge of German metaphysics in America had been recognized—but then not taken into consideration. After looking into the matter, Girard can write: Transcendentalism owed to this book "not only the interpretation of a few fragments scattered here and there from Ger-

man philosophers, but also, and perhaps more, the rousseauistic idealism expressed in many places" (413). And the same idea expressed from a different point of view: "It would not be difficult to show that what is common to Madame de Staël and to Kant came to the latter through the influence of Rousseau's *Emile* and *Profession de Foi du Vicaire Savoyard*" (415). A few pages further, Girard recalls the fact that W. E. Channing, the same who was to play so prominent a part in the formation of the Transcendentalist Club in 1836, read Rousseau assiduously during his stay in Richmond, in 1798.[2]

But the chapter on Benjamin Constant is much more striking. Although we knew badly, we did know something about Mme. de Staël; of the influence of Constant, in our days—after the loud claims of the Germans that they had done it all—who was aware? Here there is to learn even for French scholars; for, while in France Constant is first of all the author of a novel *Adolphe*, and a political writer, in America he is first of all the author of *De la Religion*.

Let us here forestall an objection. One might say—and it has been said—that Constant's ideas on religion were ideas he had found in Germany. There are two answers: In the first place it is easy to see that the ideas advocated by Constant, even if he found them in Germany, had been especially powerfully developed in France before, and indeed the Germans themselves knew it well.

Constant praises the Germans for having laid stress upon the two ideas that religious revelation through human conscience is permanent and eternal, and that the dogmatic expression of that inner revelation alone changes; but, of course, both are fundamental ideas in the *Profession de Foi du Vicaire Savoyard*. Then (this is our 2nd point) even suppose these ideas were rather German than French, there still remains the undeniable fact that Americans read them in French books—which after all is the question under discussion. Even though the transcendentalists on this side of the ocean, might have found their theology in German authors, the papers and reviews of the time show conclusively that they did *not* find it there, but in French works. Transcendentalists made use of them to refute the Christian predestinationism of

[2] An interesting remark is that while usually the action of Mme. de Staël's book is supposed to begin soon after publication, in 1814, Girard can tell that it hardly became known in America before 1820, and the real enthusiasm for the book can be traced to 1829 only (413).

the Edwardists on the one hand, and the rationalism of French and English deists on the other. "The works of B. Constant were received in New England, as soon as they came out, with a favor bordering on enthusiasm, as one will see in reading the numerous articles discussing him in the *Christian Examiner* and in the *Boston Quarterly Review*" (422). E.g. the article, *The Spirit of the Age*, has such sentences as: "Schiller, Goethe, Carlyle are still unfamiliar in America; . . . more exciting are the books of Constant and Jouffroy." Or, "The identity of the religious sentiment is the fundamental idea (in the book *De la Religion*) which one of the most eloquent orators and spiritual writers of the age has developed in the first book of his work" (Quoted p. 423). This was in 1827. In 1838 Ripley was to speak with no less feeling of Constant's importance as a thinker; see vol. 2 (p. 276, 280) of the *Specimens of Foreign Literature*.

It might well be questioned whether Girard rendered his book much clearer by treating separately the theological and the philosophical aspect of Transcendentalism. Mme. de Staël's action was both, religious, when she spoke for herself, and philosophical, when she discussed German philosophers; Constant was not so much a theologian as a philosopher dealing with religious problems; as vice-versa the Transcendentalists never lost sight of religious preoccupations when they wrote along ethical lines. But however that may be, another surprise is in store for us when we reach page 428, under the title *Du Transcendentalisme . . . sous son aspect philosophique*. Just as Girard had revealed to us, after a conscientious reading of the periodicals of the time, the profound action of Constant's book on religious speculations, so also he could record the action of another man to-day practically forgotten in America, the Baron de Gérando, on the American philosophy of the times. "When they did not owe to Mme. de Staël's book their first acquaintance with German philosophy, the Transcendentalists owed them to M. de Gérando's *Histoire Comparée des Systèmes de Philosophie*" (449).

M. de Gérando was introduced to the American public by Dugald Stewart, among others in an article of the *Edinburgh Encyclopedia*. Girard also maintains that besides directing attention to German philosophers in his *Histoire Comparée*, de Gérando contributed much to "the renaissance of studies in Greek philosophy in America before 1830" (see an article in

the *North American Review,* in 1824, vol. 18). Those who know how constantly the American Transcendentalists studied Greek philosophy, will surely understand the importance of this statement by Girard.

In 1824 de Gérando published his own views on philosophy *Du Perfectionnement Moral et de l'Éducation de Soi-même* (450) and a translation of it was published in Boston 1830 (by Elizabeth Peabody). The gist of that philosophy is indeed very transcendentalistic: "It is devoted entirely to prove that man's life is a great and continuous education which aims at all his faculties and takes in all his relations, . . . and that one must endeavor to cultivate any ideas capable of inspiring an intelligent and sincere love of virtue." "We have no ethical work of any living writer," wrote Channing in the *Christian Examiner,* "to be compared with that of Degerando" (*sic.*). And when the translation in English came out, the same *Christian Examiner* again stated: "It holds a station in moral philosophy which has not been filled by any writer in our language, either among the living or the dead" (Quoted p. 453). Girard thus concludes that the idealists of New England owed to de Gérando, besides the interest that they showed for Neo-Platonism, the definite form by which they expressed their ideas about religion, ethics, and the destiny of man (455).

Here again someone may be tempted to maintain that, having lived in Germany, de Gérando was influenced by this milieu. What about it, if de Gérando felt attracted and expressed himself sympathetically regarding such ideas in Germany that had come from, or, at any rate, were in keeping with French and English 18th century philosophy?

If Constant and de Gérando were practically forgotten by later generations, as fosterers of Transcendentalism, Victor Cousin was not. But indeed there is a long way from the part he is supposed to have played according to Riley and others, and the part played in reality. Girard throws a flood of light on this question. Of all foreign philosophers who may claim action in America in the first half of the nineteenth century, he appears now to be without doubt the most important;—not only as regards his own personal philosophy, but as a channel for whatever German philosophy finally made its way into the minds of Transcendentalists. Students were aware of this latter point, more or less; but they never took the trouble to find out what was Cousin and what was German in the theories under discussion. Things were made to look very

simple, namely: German Transcendentalism was like a father to a child to American Transcendentalism [which has never been proved]; Cousin, in his works, which were read in America, dealt with German philosophy [which is true at times]; therefore German philosophy came to America through the medium of Cousin [which is entirely misleading]. It took Girard to say at last: but Cousin was an ecclectic; if he took ideas from Germans—as he did from all quarters—he transformed them in throwing them into his melting pot of Ecclectism; thus whatever German thought there was in Cousin—and whatever American students at the end of the nineteenth century choose to call them—they were no longer German Transcendentalism.

If moreover one passes to the further question: what elements did Cousin take from German Transcendentalism for his Ecclectism?—the answer is this: "The French philosopher keeps hardly anything from Kant except his notion of free-will. . . . While the center of personality for Descartes was in thought, for Kant and Cousin it was in moral obligation. Take free-will from man, he will live like a plant. . . . He "can" because he "must," and he "must" because he "can" (466). This means ultimately much more than at first appears; for we know very well that, at the end of the eighteenth century, Rousseau had before Kant, spread those notions of "Practical reason," of conscience, of free-will. Thus what Cousin brings over from German philosophy to America, is after all, as has been said, French philosophy.

Another remark: If one does not measure things by the space allowed to the discussion of German philosophy, but by the conclusion reached, Cousin has not even changed his position after the contact with Kant and his followers; he may use perhaps other terms now more in fashion, but his attitude towards the moral significance of life was the same which he had proposed in common with the Scotch philosophers in earlier years, i.e., based on the existence of a direct moral sense: the supreme end of man, he connects with "a faculty of the mind different from all others and the function of which is to give us the idea of the good, as the function of reflexion is to give us the ideas of reflexion, and that of the exterior senses to give us sensations" (p. 462-3).

Besides the domain of ethics, there is that of natural philosophy; there one could maintain that a closer relation exists, namely between Cousin and Schelling. But, adds Girard, this part of the philosophical problem "has no connection with Transcendentalism" (407); and we might add,—

for those who think they can consider Cousin as a mere satellite of Kant and Schelling—that, if Cousin thought much of Schelling's philosophy, Schelling thought as much of Cousin's philosophy. See the Preface Schelling wrote for Bekker's work on Cousin (p. 468, note).

Now, before closing this chapter, let us borrow some of Girard's proofs that Cousin, and not German Transcendentalism, was the godfather of American philosophy before 1840! Not in the sense that he actually proposed, to his admirers on this side of the ocean, a system of which they had never thought before, but rather—as already pointed out—that they found in him a clear expression of what they were looking for, and of what they had a vague anticipation. More than that; "The ideas and arguments which will strike them when they read Cousin will not differ so much from those which they had already appreciated in Mme. de Staël and B. Constant, or in de Gérando, or other forerunners of French Ecclectism yet. Only they will find them, in the indisputable master of this new philosophy, firmer, better defined, more scientifically worded, and they will rejoice that such a scholar and such a philosopher as the famous Parisian professor should have devoted the best of his intelligence and of his eloquence, to defend religion in the very name of science, and to have rehabilitated human nature in the name of religion" (470-1). Ripley will say in his Introduction to the *Specimens:* "Cousin's Ecclectism exhibits to the speculative inquirer in the rigorous form of science, the reality of our instinctive faith in God, in virtue, in the human soul, in the beauty of holiness, and in the immortality of man. . . . It establishes on a rock the truth of the everlasting sentiment of the human heart" (Quoted p. 479).

Owing to the popularity enjoyed at the time by the *Edinburg Review,* Girard thinks that the article published there by Sir William Hamilton, in 1829, on French Ecclectism, must have called first the attention of American scholars to Cousin.

In July of the same year, Alexander H. Everett, just called to the editorship of the *North American Review,* published the Preface of Cousin to the *Fragments Philosophiques.*

And during the same year still, the same review published an account of the principal works already printed by Cousin (*Translation of Plato, Cours de Philosophie,* 2 vol. of *Fragments philosophiques*).[3]

More important than these accounts, of course, was, in 1832, the publication of a translation (made by Kinberg) of Cousin's

[3] Cousin's Translation of Plato contributed largely, after de Gérando, to encourage the study of Greek philosophy in New England.

Introduction to the History of Philosophy,—with a long review again in the *North American Review.*

In 1834, another translation of the same work (this time by C, S. Henry) was published, under the new title of *Elements of Psychology,* with an Introduction, notes, and additions. In eight years, it had three editions. And from that book was made, Girard tells us, a textbook for colleges, which was still in use in 1861 (473).

Then, in 1836-37, Orestes A. Brownson, the most speculative mind among the Americans of that generation, came around to Cousin. He had started as a disciple of Locke, whom he left for Reid and Stewart; a period of scepticism had followed which was a sort of reaction against the sentimental and romantic feelings which had filled his soul after reading Bernardin de Saint-Pierre, Constant, and Chateaubriand. In 1833 he founded the *Boston Quarterly Review;* both in this and in the *Christian Examiner* he published articles on Cousin (473). In 1836 in his little book, *New Views of Christianity, Society and the Church* he acknowledges his debt to Cousin—and to France: "She (France) exerts and must continue to exert a powerful influence on all southern and western Europe, and on our own country in particular. She is, as it were, the missionary nation of the world, and it is not a matter of indifference to other nations whether she preaches the true gospel or another. Her doctrines have immense weight in England; they reign supreme in this country; Germany reaches us only through France" (Quoted p. 474). As a counterpart of this quotation, let us reproduce this one of Cousin—who had been elected foreign member of the American Institute, Girard tells us—in his Foreword to the third edition of his *Fragments Philosophiques:* "While my writings on Education (this alludes to his famous *Report on the State of Public Instruction in Prussia* several times reprinted in America) thanks to the fine translation by Mrs. Austin spread in most of the States of the Union, sometimes under the auspices of public authority, the *Fragments,* together with my *Lectures,* founded, without my knowing it, a philosophical school in the country of Jonathan Edwards and of Franklin. But do you know what favors the new philosophy in New York and in Boston? It is, with its moral and religious nature, its method" (Quoted p. 475).

Finally, in 1838, came Ripley's *Specimens of Foreign Standard Literature—all* of which specimens are chosen from the works of Cousin, Jouffroy and Benjamin Constant. With regard to Cousin, the editor remarked: "I may venture to say

that there is no living philosopher who has a greater number of readers in this country, and none whose works have met with a more genuine sympathy, a more cordial recognition. He is destined, in my opinion, to exert an important influence on the development of thought in our youthful land" (Quoted p. 477).

Not very much less important, as regards his influence on American thinkers of that time, was the distinguished author of *Mélanges Philosophiques,* and of the *Cours de Droit Naturel,* Théodore Jouffroy, the disciple of Cousin, and who laid so much stress on the moral aspects of philosophy. Not stopping to mention the flattering references to him in *Blackwood's Magazine,* in 1826, and in the *Edinburg Review,* since 1830, attention ought to be called to an account in the *Christian Examiner* (1830) of the article *Du Scepticisme,* which Jouffroy had contributed to the *Encyclopédie Moderne* (vol. XX); then in 1837 a review, by Brownson of the *Cours de Droit Naturel;* then as a consecration of Jouffroy as a recognized authority, the generous part allotted to him in Ripley's *Specimens of Foreign Standard Literature.* "No article more than *How Dogmas Come to an End*"—says Girard—"was so well made to arouse the interest of the Unitarians who were anxious to do away with dogmatic Calvinism; and in the essay *Philosophy and Common Sense* they found again all the essential features of Scotch philosophy" (487). Finally, in 1839, W. H. Channing published the translation of the *Cours de Droit Naturel,* preceded by an important *Introduction.*

In view of all this, it is difficult to escape the conclusion that American Transcendentalism, if one wishes to look at it from this point of view of foreign influence, was more than anything else an outgrowth of French Ecclectism, even more —since Transcendentalism and Ecclectism are contemporary— than of Scotch Idealism. And the more one looks into the matter, the more the German share grows smaller. Such telling passages as already quoted, "One could not think very highly of men like Fichte, Schelling and Hegel," or: "We are not aware that any of them (German thinkers) have as yet given us a philosophy of man" (Brownson) confirm fully such passages as found by the writer under the pen of Emerson, writing about at the same date: "On the whole what have those German Weimarish friends done? They have rejected all the traditions and conventions, have sought to come thereby one step nearer to absolute truth. But still they are not nearer than others. I do not draw from them great influences. The

heroic, the holy, I lack. They are contemptuous. They fail in sympathy with humanity. The voice of nature they bring me to hear is not divine, but ghastly, and hard, and ironical. They do not illuminate me, they do not edify me . . . ." (*Diary*, April 26, 1837). Or Walt Whitman, some years later: "While the contributions which German Kant and Fichte and Schelling and Hegel have bequeathed to humanity . . . are indispensable to erudition of America's future, I should say that in all of them, and the best of them when compared with the lightning flashes and flights of the old prophets and exaltés, the spiritual poets and poetry of all lands there seems to be, nay certainly is lacking something—something cold, a failure to satisfy the deepest emotions of the soul—a want of living glow, fondness, warmth . . . " (*Late Thoughts and Jottings*, IV, 322).

As a matter of fact, American Transcendentalists never could understand German philosophy; how then could it inspire them? In 1827 the *Christian Examiner* tells us that "Schiller, Goethe, Carlyle, are still unfamiliar in America" how much more must it have been the case with philosophers! In 1830, in *Blackwood's Magazine*, which Girard assures us was read as much then in New York and Boston as in London and Edinburg, we read about a translation of Kant: "Either it is nonsense in a degree possible only to utter and determined ignorance of the German language; or it is so close a translation of the *ipsissima verba* of Kant, as to offer no assistance to an uninitiated student, to say nothing of the barbarous effect produced by a German structure of sentence and terminology altogether new" (Quoted p. 440). Again, a contributor to the *Christian Examiner*, in 1833, speaking of Kant, too, writes: "We believe it impossible to understand fully the design of Kant and his followers without being endowed to a certain extent with the same powers of abstraction and synthetical generalization which the German philosophers possess in so eminent a degree. . . . The work of the transcendental philosophers may be translated word for word, but it still will be impossible to get a cléar idea of their philósophy, unless we raise ourselves at once to a transcendental point of view" (Quoted p. 441). Here is the *Quarterly Christian Spectator:* "We have been repeatedly told that it is impossible to translate German philosophy into English. If it is so we ought not to complain of the failure of any attempt to teach us its mysteries." Here is Brownson once more: "There is no overwhelming fondness for German literature and philosophy. The genius of our country is for Ecclectism."

And here is Ripley: "The first condition of popularity among us is the clear expression of distinct thought. For this reason the German philosophers, in their native costume, will never become extensively popular in this country. The fruits of their inquiries will some day pass into general circulation among us; but not till they have been defined and clarified by sucessive operations in different minds. . . . We must start with the freer, more popular, more concrete and more finished product of the great French writers who have been formed in the German school." . . .

All the above refers of course to German Transcendentalism in America *before 1840*. How things would look if one examined Hegelianism in America after 1850, or even 1860, with the same care as Girard has done for German philosophy in the first half of the century, the writer could not now presume to say positively; but, from what he has read he would not be altogether surprised if the state of affairs proved to be not very different; namely that German philosophy, even then, even after Dr. Harris's so-called St. Louis School, was hardly known from first-hand knowledge. Possibly, one would find that the Englishman Green was the Cousin of that new half century as regards acquaintance with German Transcendentalism.

P.-S.—Since this article was written, Girard's position has been rather severely attacked by G. Sherburn, of the University of Chicago, in *Modern Philology*, Sept. 1917 (p. 125-128). In the writer's opinion, Mr. Sherburn's retort is very unconvincing. He picks flaws, but he does not in the least shake the argument; indeed he strengthens it if that is all one can oppose to Girard. With regard to the French influence, he is forced to agree that the contribution is important. With regard to Girard's "anti-German" position, he fails to make one strong point. He certainly gives no proof that American philosophers of the time knew German philosophy. And nobody who has read Girard can deny that the burden of proof rests now with Mr. Sherburn. The historians of philosophy and of literature, *later*, said repeatedly that there was close connection between American and German thought in the first part of the nineteenth century; not the contemporaries. And the assertion of historians has not the slightest value if it is not born out by the testimony of the contemporaries—which testimony is lacking, and this is precisely the interesting revelation of Girard. The weakness of Mr. Sherburn's own argumentation is well illustrated by the following sentence of his criticism: "With regard to Miss Fuller the fact that she said she could not understand Fichte is far from proving that she was uninfluenced by him" (126). Well, no! Let us suppose that it is *very* "far" from proving it;—at the same time, if the influence of Germany has to rest on such strong constructive arguments, Girard's thesis is not very seriously threatened yet!

ETHICAL ASPECTS OF CHILKAT CULTURE

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Introduction

The Chilkat, a tribe of the Tlingit linguistic group, live at the head of Lynn canal, north of Dixon entrance, in "Russian" Alaska. In 1890 the population was estimated at 812; the census of 1910 gives the population as 690.

The ensuing account is based on information obtained in Philadelphia in 1912 and 1913 from Louis Shotridge, or Xarits, a native Chilkat from the village of Klukwan. Mrs. Gerda Sebbelov Guy assisted in procuring the information and to her is due the credit for a considerable portion of it.

The informant's viewpoint has been considerably affected by his contact with civilization and cannot with any assurance be accepted as typically Chilkat. Since the tribal life is broken up into hierarchical social units it is doubtful whether any typical individual view of tribal life is to be found, since individuals necessarily see their social world from different backgrounds and with varying interest in its component parts. This was realised by the informant himself who frequently pointed out that the appeal made to him as a member of one of the two dominant groups might differ somewhat from the appeal made by the same facts to a member of one of the lower clans.

Tribal Organization

The Chilkat are divided into two exogamous groups, or moieties, known respectively as Eagle and Raven. These moieties are composed of smaller totemic groups, or clans, as represented in the following table:[1]

EAGLE,	RAVEN,
Bear	Whale
Killer-whale	Raven
Eagle	Giant
Wolf	Worm
Fishhawk	Frog
Shark	

[1] Swanton gives the fundamental divisions of the Tlingit as Raven and Wolf, but states that in the north the latter was known also as Eagle. (26th Annual Report of the Bureau of American Ethnology,

There is a chief for each moiety and one for each clan. The chief of the Whale clan is, *ipso facto,* chief of the Raven moiety, the chief of the Bear clan being, similarly, chief of the Eagle moiety.

Many facts point to the moieties as the fundamental divisions. A man belongs, first of all, to a moiety and his duties to it take precedence, generally, over his duties to the tribe. One moiety may fight with another tribe and the complementary moiety refuse to participate. Relations between the two moieties may become strained to the breaking point of open hostility. At such times wives leave their husbands and go to the houses of members of their own moiety. Should they suffer injury at the hands of members of their husband's moiety, redress would be demanded from that moiety by the moiety to which the wives belong. On one occasion, a few years ago, a fence of sticks was built through the village to keep the two moieties separate. Only messengers were allowed to cross it and any other who attempted to do so would be killed.

Punishment for serious offences, such as murder and adultery, is meted out by the moiety to which the injured person belongs. In one instance, a man while drunk had murdered his wife. Her clan was higher than his, and her moiety decreed that his sister and mother must die to expiate the crime. They were, accordingly, shot by members of the murdered woman's moiety. Two days elapsed before final decision was reached on the punishment to be exacted, as the consent of the moiety of the murderer to the decision was necessary. This was obtained only after several deliberations

1904-5. See, also, E. Sapir, Social Organization of the West Coast Tribes. Trans. Roy. Soc. of Canada, May, 1915.)

In an account of the tribal organization of the Chilkat published by Shotridge in the *Museum Journal of the University of Pennsylvania,* Sept., 1913, he adheres to the divisions of Raven and Eagle. The subdivisions, however, differ from those given the writer at an earlier date and listed above.

His published list is as follows:

EAGLE,		RAVEN,	
Chief Family	Grizzly Bear	Chief Family	Whale
	Killer-whale		Raven
	Murrelet		Kosh-day-woo-si-ta-ye-ka (human spirit turned into land otter.)
	Wolf		Monster Worm
	Eagle		Frog
	Spirit of Tsih-ko River		Crow
	Shark		

In this list also there is one more clan in the Eagle moiety than in the Raven.

and many interchanges of messages between the two moieties. A similar circumstance arose and was similarly decided when the young chief of one of the moieties was known to have seduced the wife of the chief of the other moiety.

Marriage of a parent with a child is forbidden; otherwise, the ethics of marital relations seems determined by the moiety exogamy and the clan levels. A man may marry his father's sister for she is not of his moiety. It is alleged that a man might marry even his paternal grandmother, but under no circumstances his maternal grandmother. 'To marry a member of your own moiety is the same as to marry your own sister.'

Both social and economic specialisation is represented by the clan divisions. The Bears are the carvers; they are aristocratic and have considerable leisure; the Killer-whales are the speakers and advisers. The Sharks are the warriors; they can fight like sharks. The Whales made the first blankets, and at the present day do the weaving.

The order of the clans given in the above table represents the respective levels at which marriage is possible. Thus, a Bear should marry a Whale, a Killer-whale a Raven, an Eagle, a Giant, and so on. It is very important that a woman marry on her own level. A man may marry where he likes so long as he does not violate the moiety exogamy. A woman who marries below her moiety, or without the tribe, loses membership in her clan and cannot be reinstated. Her children also are barred. A man belongs where he is born and there is no way in which he can rise to a clan higher than his own. The superior clans are not, however, always the more wealthy ones. A man of the Bear clan may be very poor while one of the Shark clan may be very wealthy. Many of the Sharks are, at present, people of considerable wealth, though this does not entitle them to any higher social position. On the other hand, display and a big show only secure the disapprobation of members of the more aristocratic clans who know that the pretenders are, after all, "only Sharks." The Eagles are the speakers and councillors. The Killer-whale people, for example, might call in a Shark rather than an Eagle to give them advice, the personal worth of the man being the determining factor. In wealth the Frog people now stand next to the Whales; yet they were spoken of by Shotridge disparagingly as being the kind of people who "do a little thing and go out of doors and howl about it." The inequality of the clans is reflected in the demands made upon the moiety as punishment for the crime of one of its members. The

murderer referred to above was of a clan lower than that of his wife and his moiety was required to sacrifice two individuals 'to even things up.' If the murdered woman had belonged to the same clan as the murderer only one life would have been required in expiation. This method of punishment affords an additional reason for discountenancing unequal marriages. In this instance the murderer wept and begged to be allowed to die in stead of his condemned sister and mother; but this the moiety of his wife would not permit.

Relations between members of the same clan are generally pleasant though not invariably so. Disputes between clans are arbitrated by the moiety, as are also serious disputes between members of the same clan, if they cannot be settled within the clan. Usually the clan decides disputes which arise among its own members. There is today ill-feeling between two groups within the Bear clan which is explained as follows: Several generations ago the oldest son in the line of descent married a woman of a lower clan and a younger son was made chief to his exclusion. The respective supporters of these two men form two factions at the present day.

In former days members of different clans within the same moiety did not mingle freely, and even to-day the boys in their games observe these clan distinctions. They will run away from a boy of a higher clan, for parents must pay for an injury done by their child to the child of another. When the chief of a moiety is injured by a man of the complementary moiety the entire moiety of the offender must make redress. The moiety of the offender will then perform one of the ceremonial dances which is the property of the moiety of the offended chief.

Slaves

Slaves were sometimes captured from the Haida or Tsimshian and sometimes captured in war. War captives were given the choice of death or slavery, and if they made the latter choice were expected to abide by it. Escape was seldom attempted and almost never successful. The mountains of the interior shut out hope of escape by land and the water routes remained the only alternative. Each chief had a trained crew of sixteen rowers who held themselves in readiness to pursue fugitive slaves. When sent on such a mission they were told: "You will receive such and such punishment if you do not capture and bring back that slave." As a matter of fact they always did capture the slave even if he had started a day or two in advance of them. The owner of a slave might

administer such punishment as he chose. As a warning to other slaves, the owner of a fugitive slave might inflict death upon one who had attempted to escape, or he might punish lightly or not at all. Slaves were usually well treated and were worthy of confidence. Some of them were old and trusty story-tellers whose principal occupation was to look after the children of the higher families. Some became wealthy and might themselves own slaves. They were sometimes given their liberty, as, for example, at the building of a new clan house or moiety house; but they could never claim liberty. Three generations ago when the house of the Raven moiety was built, the chief of that moiety freed six slaves for each post. He could then boast of having 'freed the Kwakiutl tribe.' The informant's father when he, as Raven chief, built the Raven house, freed slaves as the respective corner posts were put into the ground. He ordered the respective slave to put his mark on the post near the end which was planted in the earth. The post was then dropped into the hole which had been prepared for it and the slave told: "You are free."[2]

Slaves owned by cruel masters would attempt to escape while those owned by kind masters did not wish to leave.

Traders and Visitors

There seem to have been few winter tribal visits except such as had to do with trade in one form or another. The Kwakiutl did not visit the Chilkat, "probably because they were afraid to come among us." The most intimate relations were with the Haida and the Stik, from the Yukon. When a Haida chief came to visit, the Chilkat held dances and games to entertain their guests. The entertainment was provided by all the members of the higher clans. Some chiefs were very poor not knowing how to take care of their money. If a wealthy chief came and the chief of the corresponding Chilkat moiety were too poor to entertain him, the members of the other moiety would provide the hospitality. When a large party of Haida came in their canoes for trading purposes they were saluted by the Chilkat, who gave them a dance by way of friendly greeting. The Haida then came ashore, washed, dressed in dancing costume, and gave a dance by way of returning the greeting. Everything needed was provided for the Haida as long as their visit lasted.

The Chilkat met the Yukon or Stik Indians once a year

[2] Formerly slaves were killed when the house posts were erected (Swanton; Krause).

at a place intermediate between the tribal lands, for the purpose of trading. Here, too, dances were given in extending and returning greetings, the participants being decorated with eagle and ptarmigan feathers. Even the mothers carrying babies on their backs joined in the dances. Each man traded with a special man year after year, and would trade with no one else until he had offered his wares to him and he had gotten what he wanted. This right to trade with a particular man seems to be an inheritable right. Shotridge's father traded with a special man among the Stik Indians, this right having been willed to him by the latter's maternal uncle. This Stik would trade with no one else until Shotridge's father had come; when exchange with him had been effected, he was free to trade with any one.

The Kwakiutl are spoken of disparingly as a people who "do nothing and are no good." "They say they fit their heads to their head-dress; they ought to make their head-dress fit their heads. We have some sense: we fit our head-dress to our heads. That goes to show what they are. The Stik Indians are fine people. They live out of doors, get their food by hunting, and move their camp when they want new food. They live close to nature; they dance when in the mood; they are like animals—they live so close to nature." For the Indians of the Plains, with whom the informant had little acquaintance except through Museum collections, he had the greatest contempt. "They have only beads and showy things. But take the Pueblo Indians. They have some sense. They make pottery with designs that resemble our own. There is some sense to that." Throughout his discussion of other tribes it was noticeable that those who were like the Chilkat were "sensible and had some judgment," while those of different culture were "foolish and had no sense," but our informant seemed quite unconscious of the basis of his distinction.

The Family

Much of the social life centers about the family. Husband and wife may begin married life in the home of his parents, in that of her parents, or in a house of their own. But the proper place, if they have no house of their own, is the house of the husband's mother's eldest brother. The families dwell in wooden houses in which live sometimes one, sometimes two, sometimes as many as five or six families. The family of the chief and his slaves always have a house to themselves. One of the informant's uncles, a member of one of the higher

clans, shared a house with another family, but his own portion of the house was separated from the rest by a partition. "It is more sociable to be together. If one family can not get along with the others it moves to another house; but there is seldom any trouble." Each house has a head. This position may be filled by a woman or by a man. In those families in which more than one family live there is a communal house-life in which all participate.

"We do not marry out of love but out of respect. We are not told to love one another but to respect one another." Each shall be mindful of his or her duties toward the other especially as regards kind treatment and performing the alloted tasks. Neither divorce nor separation is recognised.

Education by Story and Tradition

In each house, not necessarily in each family, there is some one person whose particular duty it is to tell stories to the children. Some of these stories relate the origin of the tribe and of the various clans; some contain a moral, either by way of direct suggestion, or by recounting the misfortunes that befell those who disobeyed an honored custom or expressed command.

The stories are usually told by the older people, sometimes by the women, more often by the men. Frequently this duty falls upon one of the old trusty slaves, probably a Kwakiutl who is well versed in the affairs of the tribe. The Kwakiutl sometimes introduced Kwakiutl stories, usually, but not always, mentioning their origin. When, as sometimes happens, an uncle, a grand-uncle or a grand-parent comes to live in a family he or she will act as story-teller. Every night the children, both boys and girls, gather around the fire to listen to these stories. If they show signs of drowsiness the narrator cleverly inserted some amusing anecdote, perhaps something irrelevant to the story to renew their flagging interest. This rouses everyone; all laugh and the narrator again has the lively interest of his auditors. As a result of this method the stories come to incorporate elements which did not originally belong to them. The stories proper are said to contain no humorous portions.

When the children are about fourteen or fifteen years of age they tell the stories which have been narrated to them, the old people listening and making corrections. This they do for some time, both boys and girls, until they are well versed in the art, the younger children, meanwhile learning from them.

Some of the stories are very long—so long that the narrator has to stop for bed-time. It will be resumed the following evening. If the narrator has left a story incomplete the children will not fail to remind him of it the following evening. They are told only in the winter evenings. There is no taboo on telling stories in the summer, but the people are too busy to narrate them.

Children are told to obey and not ask many questions. Frequently a story is referred to by way of enforcing obedience. The children rise early in the morning, the oldest one building the fire and preparing breakfast. An incentive to be up early may be found in the following teaching: "The spirit of Success passes by early in the morning. He comes in to warm himself at the first fire that is built. He is an old man. He comes in to warm his hands. That is why you should be up early."

In the higher clans the children eat apart by themselves and before their elders have eaten. They have their own plates and knives. This is done to keep them from wanting things which the elders have; also, because they will not then annoy the parents.

Among the edibles taboo to children are sweets, food imported from without the Chilkat territory, any animal that they cannot themselves procure, and shell-fish, lest they be poisoned by the 'copper' that is often found deposited upon shell-fish.

The following story conveys its own moral:

A boy was down by the river setting snares for water fowl. He was hungry, ran back to his mother and asked for something to eat. His mother took from the basket a piece of salmon that was slightly mouldy on one side. Now mouldy salmon is the very best kind. But the boy did not know this. He threw the salmon into a corner and said in anger, "I did not want mouldy salmon."

At this moment another boy called out, "A duck is in the snare." He rushed to the bank of the river, and, while attempting to get hold of the duck, waded out too far and was covered over by the water. All about him he found fish talking his language. He scarcely knew whether they were human beings or fish. It was an interesting experience and he forgot about his home. He went to the village of these creatures. Here he found himself in a village of these fishes and did not know how to get out of it. The first thing that attracted his attention was a salmon lying in the street—that is, in one of the creeks which, to him, looked like streets. His companion said, "When you feel hungry push over a young fellow, pick him up, carry him away and eat him." Seeing a fine young fellow ahead he pushed him over, picked him up and carried him away. He had been told by his companion not to leave any pieces of the salmon lying around after roasting it, but to burn up all that was left. He did as he had been told. Whe he returned his companion asked him what

success he had had. Just then the salmon which he had roasted came back crying from a pain in one eye. "Go back and see whether some portion was left unconsumed by the fire," said his comrade. He returned and found that one eye of the salmon was in the ground at the end of the stake. (Fastening the salmon to the end of a stick in this manner was the first method of cooking.)

Next time he chose a humped-back salmon. His companion bade him pull the bark from a certain tree, put it around the fish and roast it in that. He pushed one over and carried it away. He pulled the bark from both sides of the tree, placed the salmon within it, stitched the bark around with spruce root, then covered it over with swamp cabbage and leaves, and put the whole in a heated pit where he had placed hot stones. (This was the origin of the present Chilkat method of roasting salmon.) The color of the bark was left on the fish. Later he saw this humped-back salmon crying from a pain in its jaw. Returning to the place where he had cooked it he found that a part of its jaw was not consumed. Another time he had carried off a piece of salmon and was eating it when he heard someone remark, 'Mouldy head.' Thereupon he discovered that he was among the Salmon people. Now, 'mouldy head' was the very expression his mother had used when she gave him the piece of salmon to eat. He felt home-sick and wished to go home. He observed two large swans jumping up and down in the creek. His companion said, "Jump upon the back of that swan." He did so. The swan was now sometimes in the water and sometimes in the air. He forgot his home-sickness. Next day he heard noises coming from a large house. The people within were feasting and dancing. It was the Herring house. He asked permission to enter. "You must be clothed properly," he was told. He obtained regalia and his partner gave him medicine to rub on his body. He was anxious to enter the house. He placed his eye to a crack in the boards to ascertain what was happening within. His eye was filled with herring eggs which he had to have picked out one by one. He watched the occupants gliding about within the house, then entered and joined the processions. While the boy was under the water he learned a great deal about fish. In the spring they all started away; first, the smelt, then the herring, and so on, until all had left. He was told to choose the party in which he would go.

He chose the party composed of those who were painted—for to him they all looked human. The smelt cried out, "We served human beings before you performed such service." The salmon replied, "They did not get much out of you; only soup from your head." The herring cried out, "We served human beings before you did." The salmon answered, "They did not get much out of you; your head is too bony." Each of the fishes in turn, made their claim to priority and to each of them the salmon shouted out their own superiority. The boy's companion said, "Jump up into the canoe of your father."

He jumped toward the canoe and called to his father.

His father said, "Jump again" He knew that this was said to him merely as to a salmon, and he felt badly. He then saw his mother and his companion bade him go to her.

He called to her, "Mother, here I am." She called to her husband, "Come quickly; here is a fine big salmon." The salmon-boy was frightened and went away. His companion said, "Go to her; do not be afraid." His mother called out, "Come quickly; here is a dog salmon." A hook was put down; he switched his tail around

and was fastened on it. He knew nothing more until his mother began to clean the fish which she and her husband had taken. She could not cut off the salmon's head. Upon examining it she found around the head of the salmon the copper ring which the boy had been wearing about his neck. She called her husband, pointed the ring out to him, and they procured the services of a medicine-man. The medicine-man put the salmon in a bark bundle and placed it upon a shelf. All of the people in the village fasted for four days. At the end of this period sounds were heard proceeding from the shelf. By this they knew that all was going well, and they then broke their fast. Within eight days the boy was restored to his parents. When he grew up he became a medicine-man. (This is the origin of the treatment now accorded to all animals, the unconsumed portions of their bodies being always burned.)

The informant had heard this story from a Flathead slave who had been raised by the Tsimshian, but it is said to be a Chilkat story.

This method of restoration is referred to by Swanton. The story is found also among the Chinook and the Haida.

Other stories, patterned somewhat after the above salmon story, have to do with the other animals. In this way the children are taught never to make fun of any animals and never to torment or speak slightingly of them.

Boys

A male baby is called t! *ukáneye;* from the time a boy can walk until he is of marriageable age he is known as *atk!eyátsk!;* after this as *yesgá.* From the period of puberty until marriage he is sometimes known as *yadók.*

The training of boys is under the care of both the father and mother, the mother, of course, having most to do with them when very young. Either parent may administer punishment, though a child is seldom punished. A boy who behaves properly is treated as a grown-up person. "Some boys are as dignified and as helpful as adults. My mother treated me as she treated her own brothers. My sister believes that the average boy has as much sense as an adult. 'For,' she says, 'if you tell them something, they remember twice as long as a grown person, because there is nothing on their minds to worry them.'" There is full confidence in the efficacy of proper training: "If you start a child right it goes right all its life—there is nothing to stop it. If started wrong it goes wrong all its life. The character of the child and of the man depends altogether on how it was started and trained. My sister also believes this. She was merely repeating what my mother had told her. She never whips her children—they are too good. This is because they have been trained properly. My mother used to say to her: 'Always give the

children plenty of food so that they will not want any. Food keeps children cheerful.'

"A child can not be trained after it begins to walk. You may as well allow it to go its own way then. On the other hand you cannot begin too early. As soon as a child is born you can train it. If you overdo it, however, the child becomes crazy, foolish. After they have begun to walk you must leave them alone until they can talk. Even then the only further training you can give them is to correct them when they go wrong.

"Some boys are raised from the cradle to be hunters. If the people wish to make the child a good hunter, they bring to the cradle each morning before day-light, the skull of a wolf. This they place on a box near the child. They shake him (to rouse him?) and pant, imitating the wolf, while the child gazes at the skull. A bear's skull may be used in the same way. Sometimes the nose of a recently killed wolf or bear is cut and rubbed against the similarly cut nose of the child in order that the blood of the two may be mingled. The child when it grows up will be able to smell as well as a bear. "His nose is cut on it," is an expression equivalent to "he is very adept at it." Instead of bringing the heads to the child he is sometimes taken out in the morning before breakfast and shown the stuffed head of a wolf or of a bear. This is kept up until he can walk, that is, until the age of about two years. "After this you can put nothing into their heads—it seems to slip out." In this, as in other things, to select the wrong time of day or to continue the training too long, will result in overtraining the child and will make him foolish.

The informant's father had had the mixing-blood treatment applied to him when a child and could smell like a bear. "Once when we were out in the interior upon a mountain, my father sniffed the air and said, 'I smell white man.' No one else in the party could smell the white man. But he was right. Four white men were encamped several miles away. He had as good a nose for horses."[3]

Until they are about ten years of age children are not allowed to go away from the village alone, but must be in

[3] "The minute a child cried its breath was caught in a bag. Then the bag was carried to a place where many people were passing so that it might be trodden under foot. This prevented the child from crying much when it grew older.

"If a woman wanted her girl baby to become neat in later life, she put on her breast the borings that come out of a woodworm's burrow and let the child suck this substance along with her milk. Red paint was put on a child's nose to make it strong." Swanton, p. 429.

groups of two or more. Each boy has a special friend or comrade, though boys mingle freely together, with the exception of the clan distinctions above referred to. The age at which a boy will be allowed to go off and hunt alone depends upon the courage exhibited by the lad. The following incident shows something of the hardihood of younger boys and the value placed upon this quality by elders.

Two boys, ten or twelve years of age, taking with them a rifle, went out to hunt grizzly bear. Their mother wept loudly when she heard that the boys had left the village and could not be found. Their father said he believed they had gone to hunt grizzly bear. After a search of a day and a half they were found. From a ledge they had shot a bear at close range, and had removed a portion of the hide as evidence of their achievement. The father was much pleased; he had not expected the boys to become hunters so soon. One of the boys, who is now a great hunter, had been with his father on hunting expeditions and knew the surrounding country and the places which promised game. The father remarked, "That boy usually asks questions every time he sees a bear brought in; where to hunt, how to get there, etc."

The informant once saw a boy of the age of eight or nine years bringing in a lynx from his traps some ten miles away. "I congratulated the boy's father, who replied, 'Oh, he does that every day!' His father was a great trapper and the boy had learned hunting from him."

Formerly, a skilled hunter made no secret of the place where, or the manner in which, animals were to be taken. Hence, although a boy profited most from the experiences of his father if the latter was a good hunter, he might learn the tricks of the trade from any other experienced man.

Girls

Until the age of puberty boys and girls mingle freely together, participating in the same games and associating without restraint and without the supervision of their elders. After this period the girl is looked upon as having arrived at womanhood and is not allowed to play with the boys.

At puberty the girl is secluded behind a curtain or screen in the house and remains here during four moons. During this time she is attended by an older woman, a slave, if her parents own one, otherwise a sister or her mother. Previously to this she has been taught weaving and textile work; now her mother teaches her how a woman should conduct herself,

the duties of a good wife, and the conduct that will befit her from now on.

When she comes out of her seclusion she is, it is alleged, of much lighter complexion and can then marry. But she no longer has the freedom of her girlhood days. On the contrary, she must wear a long large bonnet which projects forwards and downwards so that she can see only two or three feet ahead, and when she goes out must be attended by the slave or a female relation. From puberty until marriage her hands are wrapped in cariboo thong so that they may not come into contact with any object. This is done 'to keep them tender.' She is not allowed to cook or do other work, for she must be kept as 'pure' as possible.

A girl baby is called *t!ukáneye;* from the time she can walk and talk until puberty, she is *satk!átsko;* from then until middle age she is *yésawat;* after this she is known as *sawát.*

The father takes no part in the training and teaching of girls. Until the age of puberty he may punish them. After they have passed through the puberty ceremony he has no authority over them except as regards their marriage, for which his consent as well as that of their mother is necessary.

Girls are admonished to be quiet and not cry. They are constantly reminded, 'You are girls and not boys.' They have little say in the selection of a husband, the marriage being arranged by the parents. Girls are said to be more gregarious than boys. A girl does not have a chum or special friend as does a boy.

The Aged

The care of aged parents generally falls to their daughters. Women have a more tender feeling for their parents than do men. Sometimes, however, they go to live with one of their sons, especially if one of the latter is wealthy and the daughters are poor.

The old women braid and prepare the sinew and ropes but most of their time is given to teaching the children. The aged are respected, and it is a disgrace to permit others to support the grand-parents if the grand-children are able to do so. "I have seen a poor married couple support their grand-parents and refuse help from the chief." A man is under especial obligation to provide for his maternal grandmother.

Position and Influence of Women

The economic tasks of women differ considerably from those of men. The men do the hunting, fishing and wood-

cutting, the women the basketry and quill work.[4] Yet women may do men's work. "So much the better if they can do men's work. My aunt and my wife's aunt used to wear men's clothing, when out of the village, and do men's work. If a man wove baskets or did any of the tasks proper to the women the people would make fun of him. They would say he was more a woman than a man. I know a man who sews, weaves and does women's work; he is called a *g!áthau*, which means, half man half woman. In the olden days the people would kill such a man. It was thought a disgrace that a strong man should act like a woman.

Men and women have their distinctive dress and neither sex may use the garments of the others. A woman of sound judgment is much respected. She may speak at the tribal meetings and her words will receive the attention which they merit.

Disposal of the Dead

A child is buried in the simplest manner; so is a woman who has shown no special merit. To the body of a man who has done a great deal for the tribe considerable attention is shown. When, for example, the informant's father died, the Raven moiety was invited to participate, members from the neighboring villages coming in large numbers to sympathise and pay respect. They marched through the village dressed in their best clothing. The informant's grandfather was the first Chilkat to be buried, cremation having been practised up until that time.

The body of a still-born child was placed in a box and cremated. They put it back into the place from which it had come, that is, into the spirit realm. Old people are looked upon as having done their duty and are respected at death in much the same manner as the wealthy. If the deceased were a poor man the survivors contributed money and clothing. Should relations make much ado over the burial of a man of no account people would laugh at them. A chief's funeral is an important affair, lasting from eight to ten days, in which everyone participates. When Shotridge's maternal grandfather, a moiety chief, died, all the members of this moiety stopped work for eight days, dressed in their best clothes and paraded through the village. Large pipes were provided for the three or four hundred people from without the village who had been invited to the funeral. The relations of the

[4] Krause says that both men and women assist in mending the snow-shoes, a part being assigned to each sex. p. 208.

deceased told stories and sang songs relating to the merits of the deceased. The entire moiety of which he was chief were active participants and the complementary moiety was invited to attend. His popularity had been such that the entire tribe wished to help in raising the totem pole over his grave. But Shotridge and his brothers refused the proffered aid and erected the totem pole without other assistance.

The body of the deceased is respected because "it is the custom and you cannot get away from it. If you did not do something it would be like a dog's grave. You must not allow a human being to lie like a dog." Moreover, the dead are helped by what is done for them.

A QUALITATIVE AND QUANTITATIVE STUDY OF WEBER'S ILLUSION[1]

By MABEL ENSWORTH GOUDGE

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I. INTRODUCTION

In 1834 E. H. Weber described a tactual illusion which now bears his name.[2] When compass-points, kept equidistant, are moved with equal pressure over a cutaneous surface of varying sensitivity, the observer experiences a converging and a diverging of the two paths; a converging, when the points pass

[1] From the Psychological Laboratory of Cornell University.

[2] E. H. Weber, De pulsu resorptione auditu et tactu, *Annotat. anatom. et physiol.*, 1834, 59-75; Tastsinn und Gemeingefühl, in Wagner's *Handwörterb. d. Physiol.*, 1848, III, 524 f; Ueber den Raumsinn und die Empfindungskreise in der Haut und im Auge, *Ber. d. Sächs. Ges. d. Wiss.*, 1852, 93 ff.

from an area of greater to one of less sensitivity, and a diverging when they pass from an area of less to one of greater sensitivity. Weber indicated, in some detail, the form of the illusion as found at twelve different regions of the body.

Although the occurrence of the illusion, since Weber's time, has often been verified, and although authors have not agreed as regards his explanation of it, the illusion has never received systematic study. It seems to involve not only differences in sensitivity of the skin, but also perception of movement on the skin, relative localization of two moving points, and estimation of the distance between these points. We do not know whether the illusion is found on all parts of the cutaneous surface, whether a discontinuous movement would produce it, what rate of movement is most adequate for it, etc.

It is, then, such a systematic study (with these suggestive problems before us) that we have undertaken. We have explored the entire bodily surface for the illusion, and we have compared our results with those of Weber. We have also undertaken a qualitative study of the various factors which condition the illusion, and a quantitative study by means of which we hoped to compare direct judgments of relative distance with the indirect judgments of the illusion. In our quantitative work we employed the method of equivalents, a method first used by Weber and Wundt, later worked out by Fechner, then improved by Camerer, and standardized as laboratory method by Titchener.[3] It has recently received some criticism at the hands of Gemelli.[4] We have, however, adopted Titchener's form of the method, in the hope of obtaining a set of results adequate to a critical examination from the methodological point of view.

II. Qualitative Experiments

A. *The Nature of the Illusion at Various Regions of the Body*

The purpose of this part of our study was to explore the entire cutaneous surface for the illusion, and to obtain qualitative descriptions of the perceptive patterns which were aroused.

(*a*) *General Procedure.* The bodily surface was divided into forty-two regions; seven on the face, sixteen on the trunk, seven on the arm-hand, and twelve on the leg-foot. In the case of all bilateral parts, the left side or member was always arbitrarily chosen. These forty-two regions, which included the twelve described by Weber,

[3] For a history of the method see E. B. Titchener, Experimental Psychology, ii, 1905, 191 ff.

[4] A. Gemelli, Il metodo degli equivalenti, 1914.

were all explored by a single observer, and some of those which yielded the most clearly defined illusion were again explored by other observers. The instrument employed was the Griesbach aesthesiometer with hard rubber, slightly conical points, having a terminal diameter of 1.15 mm. The amount of pressure, which was approximately 19.5 gr. as measured on a chemical balance, was kept as nearly constant as possible. The three experimenters who took part in the experiment were practised in maintaining a uniform rate of movement; the average rate which obtained in a large majority of the experiments was 6.25 cm. per sec. The average rates for the two other experimenters were approximately 10 and 8 cm. The separations of the points of the aesthesiometer might, theoretically, be neither less than the two-point limen for the place of greatest sensitivity nor greater than the anatomical boundaries of the region to be examined. Within these limits, however, a considerable variation was possible; and since six experiments were made on every observer for a given region, various separations could be employed for every region. The actual separations used will be found in the tables. The directions of the parallel paths traced by the aesthesiometer were (1) longitudinal, *i.e.*, identical with or parallel to the median line of the trunk, face or limb; (2) horizontal, *i.e.*, at right angles to the median line; and (3) diagonal, *e.g.*, across the trunk from shoulder to hip. In the diagonal as also in the longitudinal directions the movement of the points was anterior-posterior on the face and trunk, and proximal-distal on the leg.

Wherever possible the observer, who was always blindfolded, reclined on a couch elevated by supports to a height of 1.2 m. This position allowed a free manipulation of the instrument, and secured the minimum of muscular tension on the part of the observer. The following kind of instruction was employed: "I am going to move a pair of compasses down the volar side of the left arm from near the shoulder to the finger-tips and I want you, immediately afterwards, to give an account of your experience. There will be the usual signals 'ready' and 'now.'" The observer's report was facilitated, at least once in a series on a given region, by an outline drawing of the region examined. Since the drawings served no other purpose than to aid the experimenter in obtaining accurate reports, they will not be included in our results.

The observers who took part in these experiments were Dr. C. A. Ruckmich (R), instructor in psychology, Mrs. L. D. Boring (Bo), instructor in psychology at Wells College, K. M. Dallenbach (D), J. S. Johnstone (J), and Miss J. N. Curtis (C), graduate students in psychology, Miss F. A. Bean (Be), an undergraduate majoring in psychology (Wellesley College), and the writer (G). Miss Colpitts served as experimenter when the writer was serving as observer.

(*b*) ***Results.*** Tables I-IV give the results of observer G, upon whom the entire forty-two regions were explored. The tables show the region examined, the number of cases, the actual separations in *mm.*, and include a brief description of the perceptive pattern. In the last column the numbers 1, 2, 3, etc., indicate the order of change in the relative direction of the two lines.

TABLE I

OBSERVER G. FACE

Number of cases for every region, 6

Region explored	Separations	Summary of results
I. Ear to ear over lips. Left to right.	25, 20, 15, 30, 20, 25	1. Gradually diverging to corner of lips. 2. Quickly diverging from there to center of lips. Illusion same on both sides.
II. Tongue; left margin, apex, right margin.	3, 2, 4, 2, 3, 3	Very slightly diverging on left margin to apex.*
III. Lower jaw; left to right ear. (One point on, the other beneath jaw.)	30, 25, 20, 35, 25, 20	Diverging from left ear to tip of chin. Right side corresponding.
IV. Forehead; right to left.	30, 25, 35, 20, 15, 25	Parallel.
V. Middle of forehead, down.	25, 20, 15, 30, 25, 20	Parallel.
VI. Left ear to just below clavicle; over middle of cheek and neck.	40, 35, 45, 50, 40, 45	1. Parallel or gradually converging on face. 2. Parallel on neck. (Distance less than "1".) 3. Parallel on chest. (Distance less than "2".)
VII. (A)—Center of lips to clavicle, over chin and neck.	35, 30, 30, 40, 25, 35	1. Gradually converging. Distance between initial and final distance very great.
(B)—Clavicle to center of lips, over neck and chin.†	35, 30, 30, 40, 25, 35	1. Parallel on neck to Adam's apple. 2. Then, diverging to lip. Distance between initial and final distance very great.

* Experimenter found it impossible to move compass over left margin satisfactorily, and so there is doubt of the accuracy of this report.

† This reverse direction was given on account of its mention by Weber.

TABLE II

OBSERVER G. TRUNK

Number of cases for every region, 6

Region explored	Separations	Summary of results
I. Across breasts; right to left.	55, 55, 60, 50, 45, 55	1. Parallel to right breast. 2. Diverging on right breast to nipple. 3. Converging, nipple to sternum; distance on sternum very small. Illusion same on left side.
II. Ventral side; right shoulder to left hip.	55, 50, 60, 55, 60, 55	Parallel, with slight decrease on breast-sternum regions.
III. Ventral side; halfway between median line and left side, clavicle to pelvic region.	50, 60, 65, 55, 45, 60	Parallel.
IV. Ventral side; median line, clavicle to pelvic region.	60, 55, 50, 45, 55, 55	1. Parallel to upper sternum. 2. Slightly converging on lower sternum. 3. Then slightly diverging. 4. Converging, lower pelvis.
V. Dorsal side; left to right shoulder. (Corresponding to breast region.)	50, 60, 65, 55, 60, 60	1. Doubtfully diverging to middle of shoulder blade. 2. Converging to spine; distance on spine less than on side. (Right side corresponds to left.)
VI. Dorsal side; left shoulder to right hip.	60, 65, 60, 65, 75, 70	Parallel.
VII. Dorsal side, halfway between median line and left side; top of scapula to below waist.	60, 55, 65, 50, 65, 70	Parallel.
VIII. Dorsal side; halfway between median line and left side, waist over buttocks and upper leg to knee.	70, 75, 65, 80, 90, 75	Parallel, until about two-thirds distance between buttocks and knee; then gradually diverging to end.

TABLE II—*Continued*

OBSERVER G. TRUNK

Number of cases for every region, 6

Region explored	Separations	Summary of results
IX. Dorsal side, median line; neck to buttocks.	55, 60, 65, 60, 65, 65	1. Slightly diverging on neck and shoulder regions. 2. Then, parallel. 3. Slightly diverging near buttocks.
X. Around neck.	45, 30, 25, 30, 20, 25	1. Doubtfully parallel in front. 2. Diverging from right side to spine. 3. Thence converging to left side.
XI. Around trunk; level of shoulders.	50, 65, 60, 65, 55, 60	Parallel, with slight divergence across chest.
XII. Around trunk; level of lower ribs.	45, 40, 50, 45, 50, 45	1. Parallel on dorsal side. 2. Parallel—but distance greater—on ventral side.
XIII. Around trunk; level of waist.	60, 60, 55, 65, 55, 60	1. Parallel on dorsal side, slightly converging over spine. 2. Parallel on ventral side, diverging over ribs.
XIV. Around trunk; level of hips.	50, 55, 60, 45, 50, 55	1. Parallel on dorsal side. 2. Parallel, but distance greater on ventral side.
XV. Upper arm to hip; over volar side of arm, axilla, side.	60, 50, 55, 55, 60, 55	1. Parallel on upper arm. 2. Slightly diverging on axilla. 3. Diverging over ribs. 4. Converging to waist.
XVI. Left ear to elbow; neck, shoulder, upper arm (lateral) to elbow.	40, 45, 50, 50, 55, 55	1. Converging to clavicle. 2. Then parallel to elbow (slightly diverging twice from clavicle to end of shoulder).

TABLE III

OBSERVER G. ARM-HAND

Number of cases for every region, 6

Region explored	Separations	Summary of results
I. Lateral side; near top of upper arm to finger-tips.	45, 45, 40, 43, 45, 43	1. Parallel, upper arm. 2. Diverging on elbow. 3. Parallel, forearm (or slightly diverging toward waist). 4. Diverging, wrist. 5. Slightly converging, back of hand. 6. Slightly diverging, fingers.
II. Volar side; near top of upper arm to finger-tips.	35, 30, 35, 40, 40, 35	1. Parallel, upper arm. 2. Converging on elbow. 3. Gradually diverging to wrist, sometimes, parallel halfway down arm. 4. Then, slightly converging to palm. 5. Then, diverging to finger-tips.
III. Around upper arm, halfway between axilla and elbow.	50, 60, 45, 65, 40, 50	Parallel.
IV. Around elbow.	40, 50, 55, 60, 45, 50	Parallel.
V. Around forearm, halfway between elbow and wrist.	30, 35, 25, 40, 35, 40	Parallel.
VI. Around wrist.	15, 20, 25, 20, 25, 30	Parallel.
VII. Around hand.	20, 25, 30, 35, 20, 25	Parallel (distance once doubtfully less on dorsal side).

TABLE IV

OBSERVER G. LEG-FOOT

Number of cases for every region, 6

Region explored	Separations	Summary of results
I. Ventral side; near top of upper to middle of lower leg.	60, 55, 65, 45, 60, 55	1. Parallel on upper leg. 2. Gradually diverging on knee and lower leg.
II. Ventral side; middle of lower leg to end of toes.	35, 40, 30, 25, 30, 35	1. Parallel to vicinity of ankle. 2. Diverging over ankle. 3. Then slightly converging. 4. Then gradually diverging to end of toes.
III. Dorsal side; near top of upper to middle of lower leg.	50, 60, 65, 60, 65, 70	1. Parallel on upper leg. 2. Slightly converging on knee-joint. 3. Gradually diverging on lower leg (twice, parallel, but distance greater than in "2").
IV. Dorsal side; middle of lower leg, over heel and sole to toes.	20, 25, 30, 20, 15, 25	1. Fairly parallel to vicinity of ankle (here, it was very often just a band of pressure, distances of compass points limited to size of ankle). 2. Then diverging to near tip of heel. 3. Then parallel over sole (distance between paths less than in "2").
V. Lateral side; near top of upper leg to sole of foot.	60, 65, 55, 50, 60, 60	1. Parallel on upper leg. 2. Diverging on knee region. 3. Parallel (twice, parallel to only one-half or two-thirds distance to ankle; then gradually diverging). 4. Diverging over ankle. 5. Then slightly converging. 6. Then gradually diverging to sole.
VI. Median side; near top of upper to middle of lower leg.	65, 60, 55, 70, 75, 65	1. Parallel to or just below knee. 2. Then gradually diverging.

TABLE IV—*Continued*

OBSERVER G. LEG-FOOT

Number of cases for every region, 6

Region explored	Separations	Summary of results
VII. Median side; middle of lower leg, ankle and sole.	35, 25, 40, 30, 40, 35	1. Parallel to vicinity of ankle. 2. Gradually diverging to sole of foot. 3. Parallel.
VIII. Around upper leg; halfway to knee.	65, 60, 55 , 70, 50, 65	Parallel.
IX. Around knee.	35, 40, 30, 45, 20, 30	Parallel.
X. Around lower leg; halfway between knee and ankle.	40, 30, 45, 25, 35, 40	Parallel.
XI. Around leg above ankle.	30, 40, 35, 45, 30, 60	Parallel.
XII. Around foot.	25, 30, 20, 30, 15, 20	Parallel (sometimes doubtful whether distance on top of foot greater than on sole).

The tables show that the illusion is found in 55% (24 out of 42) of the regions examined. It occurs more frequently in the longitudinal than in the transverse direction; the ratio of occurrence to absence in the former direction is 15:3, in the latter, 8:11. The only regions where the illusion is found in the transverse direction are across the face, the tongue, around the trunk at the neck, the shoulders, the breasts, and waist. There are two places around the trunk, however, at the lower ribs and hips, where the two lines were perceived as parallel, but where the distances between them were greater on the ventral than on the dorsal side. These two cases we have regarded as doubtful.

The most marked illusions occur in the following regions: (1) ear to ear over lips; (2) lower jaw,—ear to ear; (3) centre of lips to clavicle; (4) across breasts; (5) upper arm to hip,—volar side of arm, axilla, side; (6) ventral side of trunk, median line; (7) lateral side of arm-hand; (8) volar side of arm-hand; (9) ventral side of leg-foot,—middle of lower leg to end of toes; (10) dorsal side of leg-foot,—middle of lower leg, over heel and sole; (11) lateral side of leg-foot; (12) median side of leg-foot,—middle of lower leg, over

ankle and sole. There is a close correspondence in the course of the illusion between corresponding parts of the arm-hand and leg-foot regions; but the illusion is more marked on the former.

(*c*) *Comparison with Weber's results.* The illusions as reported by G correspond for the most part with those mentioned by Weber for the same regions. The differences are given in Table V.

TABLE V

Region	Place of change	Weber's results	Our results
Across breasts.	From side to centre.	Diverging all the way.	Parallel to beginning of breast, then diverging.
Lateral side of trunk.	Over ribs from end of axilla.	Converging.	Diverging.
Same.	Between last rib and hip.	Diverging.	Converging.
Ventral side of trunk, median line.	Upper part of sternum.	Diverging.	Parallel.
Lower leg over calf to arch of foot.	Lateral side of leg—foot to arch.	Diverging.	(a) Parallel. (b) Diverging at ankle. (c) Converging. (d) Parallel.
Same.	Median side of leg—foot to arch.	Diverging.	(a) Parallel to vicinity of ankle. (b) Diverging to arch.
Trunk.	Around neck.	No regularity.	(a) Diverging on dorsal side to vertebral prominence. (b) Converging.

(*d*) *Experiments with Other Observers.* We selected several regions for exploration with other observers. The only changes in these experiments were an increase (in some instances) of the number of tests for certain regions, and a greater variation of the aesthesiometer separations. The results are given in Tables VI-IX.

TABLE VI

EAR TO EAR, OVER LIPS

Obs.	No. cases	Distances	Summary of results
Be	6	25, 20, 30, 25, 35, 30	Diverging to center of lips. Illusion the same on both sides of face.
Bo	6	25, 20, 30, 25, 35, 30	1. Parallel to corner of lips. 2. Diverging to center of lips. Same on both sides.
J	30	20, 23, 18, 10, 20, 19, 23, 25, 25, 30, 19, 20, 30, 19, 18, 28, 27, 25, 26, 26, 25, 20, 23, 25, 30, 30, 20, 12, 18, 19	1. Gradually diverging to corner of lips. 2. Quickly diverging to center of lips. Illusion the same on both sides of the face.

TABLE VII

VOLAR SIDE OF ARM-HAND

Obs.	No. cases	Distances	Summary of results
Bo	6	35, 40, 30, 45, 35, 40	1. Parallel or diverging on upper arm. 2. Converging at elbow. 3. Diverging to wrist.* 4. Converging at base of hand. 5. Diverging to end, or diverging to mounds then converging, then diverging or parallel.†
D	25	35, 10, 30, 33, 30, 30, 31, 35, 30, 25, 20, 20, 10, 40, 25, 25, 10, 40, 30, 35, 15, 25, 20, 15, 25	1. Parallel on upper arm. 2. Slightly converging at elbow. 3. Gradually diverging to wrist. 4. Converging to palm. 5. Diverging to mounds. 6. Parallel to finger-tips.
R	25	35, 15, 20, 20, 30, 30, 25, 20, 30, 20, 15, 40, 35, 30, 39, 35, 36, 20, 40, 32, 35, 15, 30, 20, 33	1. Parallel on upper arm. 2. Slightly converging at elbow. 3. Gradually diverging to wrist, or parallel to wrist then diverging. 4. Converging to middle of palm. 5. Diverging to finger-tips.

* Twice, a divergence followed by a convergence occurred between elbow and wrist.
† Once, divergence at base of hand, then convergence to palm, and divergence to finger-tips.

TABLE VIII

OBSERVER C. TRUNK

Number of cases for every region, 6

Region explored	Distances	Summary of results
Across breast.	50, 55, 45, 55, 60, 55	1. Converging to right breast. 2. Diverging on right breast to nipple. 3. Converging, nipple to sternum, distance on sternum very small. Illusion same on left side.
Across back—left to right shoulder (lower part).	55, 60, 65, 50, 55, 50	1. Diverging to middle of left shoulder blade. 2. Converging to spine; distance here very small. Illusion same on right side.
Upper arm to hip—over volar side of arm, axilla, side.	45, 40, 45, 45, 50, 55	1. Parallel on arm. 2. Diverging on axilla. 3. Parallel. 4. Converging at waist.
Around neck.	25, 30, 30, 25, 20, 30	1. Parallel on ventral side; twice diverging slightly to, and converging from, median line.
		2. Diverging to, and from, vertebral prominence. Amount of divergence greater than in "1".

TABLE IX

OBSERVER Bo. LEG-FOOT

Number of cases for each region, 6

Region explored	Distances	Summary of results
Dorsal side of leg: near top of upper to middle of lower.	65, 70, 60, 75, 70, 70	1. Parallel to point beyond knee-joint (twice, converging). 2. Slightly diverging to end.
Dorsal side of leg: middle of lower to toe.	30, 25, 40, 35, 30, 30	1. Parallel to near heel. (Once, divergence at beginning of ankle.) 2. Diverging to end. (Once, converging at instep: then diverging to end.)

A comparison of Tables VI-IX with Tables I-IV shows that, with the following exceptions, the illusions are the same for these observers as for G. (1) For Bo, the lines were parallel (instead of diverging) from ear to corner of lips; parallel (instead of converging) over knee-joint, dorsal side; and diverging (instead of parallel) over sole of foot. (2) For C, the paths were converging (instead of parallel) from side to breast, and parallel (instead of diverging and converging) over ribs from axilla to near waist. (3) For D, they were parallel (instead of diverging) on volar side of fingers. It will be noticed that in none of these cases is there a reversal of direction as regards convergence and divergence; and the general agreement of all observers, including Weber, bespeaks the stability of the illusion.

There is one respect, however, in which our results differ from Weber's; namely, in the effect on the illusion of two-point separations below the two-point limen. For example, Weber gives the value of the two-point threshold on the forearm as 40 mm. When the distances between the compass-points were from 16 to 25 mm., he found that the impression on the fore-arm was not that of two parallel lines but that of a single line which divided at the palm of the hand. When the distance was 40 mm., the impression was that of two parallel lines. In other words, the typical illusion fails in his case for distances considerably below the two-point limen.[8] In our own experiments we have repeatedly employed distances on the fore-arm ranging from 10 to 40 mm., and we have never failed to obtain the illusion. Weber warns against what we now call the stimulus-error, and of course our observers were trained to avoid that. The only explanation we can offer for the difference of results is that Weber may have employed a pressure less than the 19.5 gr. of our experiments. We might perhaps expect the two-point limen for a moving stimulus to be less than that for an unmoved stimulus; but we know of no observations which cover this point.

B. *The Influence of Various Conditions on the Illusion*

The factors which we have investigated as conditioning the illusion are as follows: (*a*) the correspondence of certain of our qualitative results with differences of sensitivity in similar regions as measured by the two-point limen; (*b*) the continuity *vs.* the discontinuity of stimulation; (*c*) variation in the rate of movement of the stimulus; (*d*) the influence of visualization and eye-kinaesthesis on the illusion; (*e*) ease of localization of the stimulus, and variations in quality, intensity and clearness of the impressions; and (*f*) racial differences.

(*a*) *Correspondence between the Illusion at Certain Regions and Differences of Sensitivity at these Regions.* Vierordt has given sets of values showing differences of sensitivity at (1) the ventral-median line of head, neck, trunk, and leg; (2) the

[8] E. H. Weber, *Ueber den Raumsinn*, 93 f.

dorsal-median line of the same parts; (3) the side line of the trunk; (4) the volar-side of the arm; and (5) the face. Weber has given detailed descriptions of variations in sensitivity of the cutaneous surface at various regions.[6] We have utilised these descriptions by comparing them with our qualitative results. The following table shows the changes of the illusion as compared with changes in sensitivity.

TABLE X

Region	Changes in Illusion	Changes in Sensitivity	
		Weber	Vierordt
I Ear to ear over lips.	1. Gradually diverging to corner of lips (or parallel). 2. Quickly diverging from corner to centre of lips. Illusion same on both sides.	1. Progressively greater. 2. Prog. greater.	1. Progressively greater. 2. Prog. greater.
II Lower jaw; ear to ear.	1. Diverging from ear to tip of chin. Illusion same on both sides.	1. Prog. greater.	1. Prog. greater.
III Centre of lips to clavicle.	1. Converging.	1. Prog. less.	1. Approximately equal. 2. Prog. less.
IV Across breasts.	1. Parallel to right breast (or converging). 2. Diverging on right breast to nipple. 3. Converging to sternum. Illusion same on left breast.	1. Prog. greater. 2. Prog. greater. 3. Prog. less.	

[6] K. Vierordt, *Physiologie des Menschen*, 1877, 343-349; Weber, *De pulsu resorptione auditu et tactu*, *l. c.*

TABLE X—*Continued*

Region	Changes in illusion	Changes in sensitivity	
		Weber	Vierordt
V Upper arm to hip; volar side of arm, axilla, side.	1. Parallel on upper arm. 2. Diverging (slightly G) on axilla. 3. Diverging over ribs (or parallel). 4. Converging to waist.	1. Small difference. 2. Greater sensitivity? 3. Prog. less.* 4. Prog. greater.*	3. (a) less.* (b) greater. 4. Less.
VI Ventral side of trunk; median line.	1. Parallel on upper sternum. 2. Slightly converging on lower sternum. 3. Then slightly diverging. 4. Converging, lower pelvic region.	1. Prog. greater.* 2. Prog. less. 3. Prog. greater. 4. Prog. less.	1. Approx. equal. 2. Less. 3. Approx. equal. 4. Approx. equal.
VII Lateral side of arm-hand.	1. Parallel, upper arm. 2. Diverging, elbow. 3. Parallel fore-arm (or slightly diverging to waist). 4. Diverging at waist. 5. Slightly converging, back of hand. 6. Slightly diverging, fingers.	1. Approx. equal. 2. Greater. 3. Approx. equal, to near wrist. 4. Greater (greater than 2). 5. Less. 6. Greater.	
VIII Volar side of arm-hand.	1. Parallel, upper arm. 2. Converging, elbow-joint. 3. Gradually diverging to wrist; sometimes parallel halfway to wrist. 4. Then slightly converging to palm. 5. Then diverging to finger tips; or parallel.	1. Approx. equal. 2. Greater.* 3. Approx. equal; greater at wrist (greater there than at elbow.) 4. Prog. less. 5. Prog. greater.	1. Approx. equal. 2. Approx. equal. 3. Prog. greater. 4. Approx. equal. 5. Prog. greater.

* The asterisks indicate a non-correspondence of divergence with greater, and convergence with less, sensitivity.

TABLE X—*Continued*

Region	Changes in illusion	Changes in sensitivity	
		Weber	Vierordt
IX Ventral side of leg-foot —middle of lower leg, over foot.	1. Parallel to vicinity of ankle. 2. Diverging over ankle 3. Then slightly converging at instep. 4. Then, gradually diverging.	1. Approx. equal. 2. Greater. 3. Less. 4. Prog. greater.	1. Approx. equal. 2. Approx. equal. 3. Prog. greater.* 4. Prog. greater.
X Dorsal side of leg-foot —middle of lower leg, over heel and sole.	1. Fairly parallel to vicinity of ankle. 2. Then diverging to near tip of heel. 3. Then, parallel or diverging over sole.	1. Approx. equal. 2. Prog. greater. 3. Prog. less* to arch; then progressively greater to toes.	
XI Lateral side of leg-foot.	1. Parallel on upper leg. 2. Diverging, knee-region. 3. Parallel twice, parallel to only one-half or two-thirds distance to ankle, then gradually diverging. 4. Diverging over ankle 5. Then slightly converging. 6. Then gradually diverging on sole.	1. Approx. equal. 2. Greater. 3. Approx. equal. 4. Greater. 5. Less. 6. Equal?*	
XII Median side of leg-foot —middle of lower leg, over ankle and sole.	1. Parallel to vicinity of ankle. 2. Gradually diverging to sole. 3. Parallel.	1. Approx. equal. 2. Greater (then less?) 3. Approx. equal.	

* The asterisks indicate a non-correspondence of divergence with greater, and convergence with less, sensitivity.

It was Weber's belief that the illusion is directly conditioned upon change in sensitivity of the cutaneous surface. "Sie [die Bahnen] scheinen an den Teilen der Haut zu divergieren, wo die Hauttheile auf feiner fühlende übergehen, sie scheinen dagegen dann zu convergieren, wenn sie von feiner fühlenden Hauttheilen auf stumpfer fühlende übergehen." This position has been questioned by Lichtenfels, Wundt and Judd.[7] Wundt lays it down as a general rule that the perception of local differences and the estimation of the distance between two impressions are independent; the illusion is therefore conditioned upon other factors. Judd bases his objection on results obtained by Camerer, who found, by the method of equivalents, that the same separations were occasionally judged as equal when the points were placed upon cutaneous surfaces of different sensitivity. Our results show however, that, with eight exceptions, an increase in sensitivity (according both to Weber and to Vierordt) corresponds with a divergence, a decrease with a convergence, while an "approximately equal" may correspond with divergence, convergence, or parallelism. This latter equivocal correspondence, taken together with the eight exceptions, points to other determining factors in the illusion, which we shall discuss later.

(*b*) *Continuity vs. discontinuity of movement.* Wundt mentions continuous movement of the stimulus as a condition of the illusion. This factor we have attempted to investigate as follows. We selected regions (explored in previous experiments) where the illusion was well defined; and we moved the stimulus over such a region, first continuously, and then after an interval of one second discretely, the stimulus being now moved for a short distance only over those places where the earlier results indicated a change in direction of the paths. The observers were instructed in both cases to report the impression perceived. We give a summary of the results of the discontinuous series in Table XI.

The table shows (1) that with discontinuous stimuli the illusion of converging and diverging paths practically never occurs; we find instead a series of short parallel paths which vary in amount of separation; and (2) that the relative magnitudes of the distances between the paths at the places of change are similar with discontinuous and with continuous movement. Where the continuous stimuli yield a convergence,

[7] E. H. Weber, *Ueber den Raumsinn*, 93; R. Lichtenfels, *Sitzungsber. d. W. Akad*, vi, 1851, 348 f.; W. Wundt, *Grundzüge*, ii, 1910, 465; C. H. Judd, *Philos. Stud.*, xii, 1896, 457; W. Camerer, *Zeit. f. Biol.*, xxiii, 1886, 509.

TABLE XI

Obs.	Region	Places of change on region	Results with Discrete Stimuli
Bo	I. Ear to ear over lips.	a	Paths parallel.
		b	Same, but distance less than at a.
		c	Same, but distance less than at b.
		d	Same, but distance less than at c.
		e	Same but distance equal to d.
	II. Volar side of arm-hand.	a	Paths parallel.
		b	Same, but distance less than at a.
		c	Same, but distance greater than at b.*
		d	Same, but distance less than at c.
		e	Same, but distance greater than at d.
	III. Dorsal side of leg near top of upper to middle of lower.	a	Paths parallel.
		b	Same, but distance less than at a.
		c	Same, but distance greater than at b.
	IV. Dorsal side of leg-foot; middle of lower leg to toes.	a	Paths parallel.
		b	Same, but distance greater than at a.
		c	Same, but distance greater than at b.
	V. Across breasts.	a	Paths divergent.†
		b	Paths parallel, but distance greater than a.
		c	Same, but distance less than at b.
	VI. Across back.	a	Paths parallel.
		b	Same, but distance greater than at a.
		c	Same, but distance less than at b.
C	VII. Upper arm to hip, —over volar side of arm, axilla, side.	a	Paths parallel.
		b	Same, but distance greater than at a.
		c	Same, but distance less than at b.
		d	Same, but distance less than at c.
	VIII. Neck.	a	Paths parallel.
		b	Same, but distance less than at a.

*Twice not parallel; (1) diverging, (2) diverging then converging.
† The discontinuous distances on this region were reported as very difficult to judge. Sometimes no judgments could be given, or only doubtful ones.

there the distance between the parallel paths is less than that at the preceding place in a region; and, conversely, where they yield a divergence, the distance is greater.

It appears, then, that short movements on the skin are sufficient for a perception of direction and relative distance, but that they do not permit the perception of a change in the direction of movement. This result is perhaps conditioned, in part at least, upon the fact, first observed by Hall and Donaldson,[8] that a moving point on the skin must traverse a certain distance before a judgment of direction can be given. Since the points were put down near the place of change, the relative direction of the two paths would naturally be perceived as parallel; and before a change could be discriminated, the movement came to an end.

(*c*) *Variation in Rate of Movement of the Two-point Stimuli.* The authors who discuss the illusion do not agree as regards the optimal rate of movement. Halliburton and Ladd say that the compasses should be moved slowly, Schaefer 'with sufficient speed,' and Wundt, quickly.[9] We repeated the experiment with two observers and at various regions with the following rates (cm. per sec.): 1.56, 3.13, 12.5 and 25. Since in the majority of our experiments we employed the rate of 6.25 cm. per sec, we can compare our former results with those of the new rates. We give the latter in Table XII.

It will be seen that none of the four rates employed in this group of experiments gives the illusion as consistently as the rate of 6.25 cm. per sec. There is also a rather wide individual variation. With the fastest rate Bo did not obtain the illusion; and at the other extreme, although the illusion was more marked, new variations appeared. C, on the other hand, finds the faster rate more favorable to the illusion than the slower. The fact that both observers find numerous irregularities, smaller convergences and divergences, etc., with the very slow rate, seems to suggest that some other factors which as a rule are not functioning in the illusion, such, *e.g.*, as differences in quality or of distinctness of impression, or perhaps visual imagery, may be operative. We return to this point later.[10]

(*d*) *Effect of Visualization: Experiments with Blind Observers.* All our observers reported that eye-movement and

[8] G. S. Hall and H. H. Donaldson, Motor Sensations of the Skin, *Mind*, x, 1885, 563 ff.

[9] W. D. Halliburton, *Handbook of Physiology*, 1911, 766; G. T. Ladd, *Elements of Physiological Psychology*, 1892, 406; E. A. Schaefer, *Textbook of Physiology*, 1911, 943; W. Wundt, *loc. cit.*

[10] See pp. 118 f.

visual imagery were usually, if not invariably, present, in the perception of the illusion. Attempts under instruction to inhibit both kinaesthesis and imagery failed; partly because the effort itself failed, partly because the inhibition served as a distraction from the perception of the illusion. Only in one instance, when the *O* was allowed with open eyes to fixate an object, was there a pure tactual perception of moving points. The experience was not clear, however, and the direction and localization were indefinite.

TABLE XII

OBSERVER BO. INFLUENCE OF VARIOUS RATES OF MOVEMENT

Regions explored	Rates in cm. per sec.			
	25	12.5	3.13	1.56
I Ear to ear over lips.	Practically parallel; slight divergence to centre of lips.	Practically parallel; very slight divergence to centre of lips.	More marked? also paths bulged on centre of cheeks.	More marked; also paths bulged on centre of cheeks.
II Volar side of arm-hand.	Approximately parallel; a slight divergence near wrist; some variation on palm; slight convergence at elbow.	As average.	As average except no convergence at elbow.	More marked. Also, there were besides the usual convergences and divergences many smaller ones, succeeding each other incessantly.
III Dorsal side of leg—near top of upper to middle of lower.	Practically parallel.	As average.	As average.	More marked. Once, an extra divergence and convergence on lower leg.
IV Dorsal side of leg—middle of lower leg to toes.	Practically parallel.	As average.	More marked; extra changes noted: (1) convergence just below ankle; (2) convergence at instep.	More marked; two extra changes noted as with the faster rate.

OBSERVER C

I Across breasts	As average.	As average.	As average.	Paths crossed and recrossed (in one experiment 15 times); no regularity about the crossing or about the variations of distance.
II Across back—left to right shoulder (lower part.)	As average; but the maximal distances and minimal distances come too soon, i.e., a displacement of illusion to the right.	As average.	In general, as average; sometimes the upper path seemed to pass over into the lower.	Illusion different with no regularity; also crossing of the paths.
III Upper arm to hip—over volar side of arm, axilla, side.	As average.	As average.	As average.	Same as for back region.
IV Neck	As average	As average	Practically parallel.	Practically parallel.

In the hope of obtaining some indication of the bearing of visualization upon the illusion, we performed a number of experiments with four congenitally blind observers: H. Coover (Co), R. Hudson (H), B. Lowe (L), and H. Stitt (S). All were of high-school age, pupils of the Ohio State Institution for the Blind; the experiments were performed at Columbus. The conditions of the experiment were the same in every respect as those in the Cornell laboratory, except that twelve observations were taken, instead of the usual six. All observers were given preliminary experiments with both single and double points, and with instructions to describe the experience. When they had become accustomed to the situation, the experiments proper were begun. We give a summary of the results in Table XIII.

TABLE XIII

Obs.	Region explored	Distances used (in mm.)	Summary of results
Co.	Volar side of arm-hand (left).	35, 45 40, 40 45, 45 40, 40 35, 35 40, 40	1. Parallel on upper arm, 8 times; diverging, 3 times. 2. Converging at elbow, 5 times; converging to diverging, each, 3 times. 3. Diverging on lower arm, 6 times; parallel, 3 times; converging, 2 times. 4. Diverging on wrist, 7 times; parallel, 4 times. 5. Parallel on hand, 6 times. 6. Parallel on finger, 8 times.
H.	Volar side of arm-hand (left).	35, 45 40, 40 45,4 5 40, 40 35, 35 40, 45	1. Parallel on upper arm, 7 times; parallel then converging, 4 times. 2. Converging at elbow, 6 times; parallel, 5 times. 3. Parallel, then converging, 5 times; parallel, 4 times. 4. Parallel on wrist, 6 times; diverging, 6 times. 5. Parallel on hand, 7 times; diverging, 4 times. 6. Parallel on fingers, 10 times.
L.	Volar side of arm-hand (left).	35, 45 40, 40 45, 45 40, 40 35, 35 40, 45	1. Converging on upper arm, 7 times; parallel; 3 times. 2. Converging at elbow; 9 times; diverging; 3 times. 3. Diverging on lower arm, 6 times; converging, 6 times. 4. Diverging on wrist, 6 times; converging, 6 times. 5. Converging on hand, 5 times; diverging, 4 times. 6. Diverging on fingers, 5 times; converging, 4 times.
S.	Volar side of arm-hand (left).	35, 40 40, 30 45, 35 40, 30 30, 35 40, 30	1. Parallel on upper arm, 12 times. 2. Converging at elbow, 6 times; parallel, 4 times. 3. Parallel on lower arm, 6 times; converging and diverging, 2 times each. 4. Parallel on wrist, 7 times; diverging, 3 times; converging, 2 times. 5. Parallel on hand, 6 times; diverging, 5 times; converging, 1. 6. Parallel on fingers, 6 times; diverging 4 times.

If we regard the perception of change of direction and relative distance of the two paths as the essential mark of the illusion, we must conclude that the congenitally blind may experience the illusion, and that visualization is not a necessary component of the perceptive pattern in the normal individual. The differences between the reports of the two types of observer show, nevertheless, that the change in direction is much less frequent in the blind, and that there are greater inconsistencies not only between reports of single observers, but also between observations of different observers. We must suppose that visualization lends greater facility to the perception of relative direction and distance on the skin, and thus to the perception of change in direction of the cutaneous paths.

(*e*) *Ease of Localization and Variations of Intensity and Clearness, and of Quality, of the Cutaneous Impressions at Various Places.* Lichtenfels, Wundt and Judd, who, as we have already seen, do not accept Weber's explanation of the illusion, suppose that it is conditioned upon differences in degree of distinctness (*Deutlichkeit*) of the impression at various points of its course.[11] We have, accordingly, performed experiments in which we asked two observers to report differences of ease of localization, of intensity and clearness, and of quality. These terms were meant to be taken in a rough, everyday sense; we hoped only to find characterizations of experience which might be parallel to the course of the illusion. Observer C, however, was unable to give reports of quality in any other than its attributive sense, and failed, therefore, to find any qualitative differences. A summary of the reports of the two observers will be found in Table XIV.

A comparison of Table XIV with Tables I-IX shows that, as a general rule, a change in ease of localization corresponds with a change in the course of illusion; that less-to-greater ease is correlated with a divergence, and greater-to-less ease with a convergence. Furthermore, an increase in intensity and clearness of the experience is in general correlated with a divergence, and a decrease with a convergence. Finally, in the case of one observer, we frequently find a change in quality correlated with a change in the direction of the illusion. This observer reported also that the clearness of the visual images accompanying the impression varies directly with the clearness of the pressure sensations. There are, however, exceptions to the rules. Observer C found no difference in ease of localization across the breasts, and she found the most

[11] See p. 97.

TABLE XIV

OBSERVER BO.

Region explored	Localization	Intensity and clearness	Quality
I. Ear to ear, over lips.	1. Easiest over lips.	1. Most intense and clear over lips. 2. Then, corner of mouth. 3. Then cheek.	1. "Brighter," "larger" over mouth. Over solid structures a perception of hardness. Over soft structures a perception of softness.
II. Volar side of arm-hand	1. Easiest on fingers. 2. Then (nearly as easy), palm and wrist. 3. Then, elbow-joint. 4. Then, lower part of forearm. 5. Then, upper part of forearm. 6. Then upper arm.	1. In general, most intense and clear on elbow-joint, beginning of hands, transition from hand, to fingers; and 2. Less intense and clear on arm than hand. 3. Particularly clear at bumpy places and elbow-joint.	1. "Granular, thick" on elbow-joint ("like knee-joint"). 2. "Big, granular" on hand, wrist ("like ball of foot".) 3. "Diffuse, flat, thin," on upper arm ("like that on upper leg".) 4. Quality intermediate between "1" and "3" on forearm.
III. Dorsal side of leg,—near top of upper to middle of lower.	1. Easiest on knee-joint. 2. Then, calf. 2. Then, upper leg.	1. Most intense and clear on knee-joint. 2. Then, lower leg. 3. Then, upper leg.	1. "Granular, thick" on knee-joint. 2. "Diffuse, flat" on upper leg. 3. Quality intermediate between "1" and "2" lower leg.
IV. Dorsal side of leg,—middle of lower to toes.	1. Easy, from ankle to instep. 2. Difficult on leg and near instep.	1. Most intense and clear on sole. 2. Then, heel (nearly equal to "1"). 3. Then, leg.	1. "Much bigger, more granular" on sole and more apt to set up tickle. 2. Then, on leg.

TABLE XIV—*Continued*

OBSERVER C

Region explored	Localization	Intensity and clearness
I. Across breasts.	No differences.	1. Most intense and clear on sternum. 2. Then, sides. 3. Then, breasts.
II. Across back—left to right shoulder (lower part).	Easy all the way.	Doubtfully the same all the way across.
III. Upper arm to hip—over volar side of arm, axilla, side.	1. Easiest on arm. 2. Then, near wrist. 3. Least easy at end of axilla.	1. Most intense and clear on arm. 2. Then, sides. 3. Then, axilla.
IV. Neck.	1. Easiest at vertebral prominence. 2. Then, Adam's apple. 3. Then, side.	1. Most intense and clear at vertebral prominence. 2. Gradually less intense and clear to sides. 3. Same across ventral part.

intense and clear experience on the sternum (where the illusion shows a convergence) and a less clear impression on the breasts (where the illusion shows a divergence). Moreover, in the region across the back, this observer found no difference in ease of localization and in degree of clearness at any point in the illusion. Taking the results as a whole, however, the correlation of ease of localization and degree of intensity and clearness with change in the direction of the paths is about the same as the correlation of the latter with change in degree of sensitivity. The issue between Wundt and Weber must, therefore, be settled on other grounds. We reserve the discussion of this point until we come to consider our results as a whole.

(*f*) *Racial Differences.* We undertook some experiments with two colored observers, the one (Ca) a negress, the other (M) a mulatto. We explored the same regions as those chosen for more detailed study in our other experiments; and we employed the same procedure throughout, except that we doubled the number of observations for a region. Despite the fact that we gave preliminary series before the experiments proper began, the results were not satisfactory. Not only do the reports differ materially from those of other observers (with the exception of the ear-to-lip illusion), but there is also so little uniformity that a conclusion regarding racial differences is impossible. We append, however, in Table XV sample results for two regions for each observer.

TABLE XV

OBSERVER CA.

Region	Distances	Summary of results
Ear to ear over lips.	30, 30, 25, 20, 25, 30, 30, 25, 30, 25, 30, 25	1. Parallel to corner of lips but converging just at corner, 4 times. 2. Diverging to centre of lips. 3. Parallel to ear, but 3 times diverging toward the ear.
Volar side of arm-hand to finger-tips.	40, 45, 35, 40, 35, 40, 40, 45, 40, 35, 40, 45	1. Parallel on upper arm. 2. Converging at elbow. 3. Diverging halfway to wrist. 4. Converging to near wrist. 5. Diverging over wrist to palm. 6. Converging from palm to finger-tips 7 times, diverging 3 times, parallel 2 times.

OBSERVER M.

Ear to ear over lips.	30, 25, 20, 35, 30, 30, 25, 30, 25, 35, 30, 25.	1. Parallel at beginning. 2. Diverging on cheek. 3. Then converging to corner of lips. 4. Diverging to centre of lips. Illusion in reverse order on other side.
Volar side of arm-hand to finger-tips.	35, 40, 35, 30, 40, 40, 35, 40, 35, 30, 35, 40	1. Usually parallel on upper arm either for a short distance, or to elbow, or to beyond elbow. If parallel only part of the distance, then converging to elbow. Sometimes diverging on upper arm. 2. Diverging over elbow to center of forearm; only once converging at elbow joint. 3. Then, converging. 4. Then diverging over wrist. 5. Converging over base of hand. 6. Diverging over palm. 7. Converging at mounds. 8. Parallel, converging, or diverging over fingers.

C. *Summary of Qualitative Results*

We have found (1) that Weber's illusion occurs in some form in most regions of the body, and that any one form is fairly constant for normal observers. (2) In our study of the various conditions of the illusion we have found (*a*) that there is a high correlation between change in direction of the paths and degree of sensitivity as measured by Weber and Vierordt; (*b*) that the characteristic convergence and divergence of the paths do not appear unless the movement of the stimulus is continuous; (*c*) that rates of movement above 12.5 and below 3.13 cm. per sec. are not adequate to the illusion for all observers; (*d*) that congenitally blind individuals may experience the illusion, so that the visualization which is common for normal observers is not a necessary component of the perceptive pattern; (*e*) that there is a high correlation between places of change in the illusion and ease of localization and variation of intensity and clearness of the cutaneous impressions at these places; and (*f*) that experiments with two observers of the negro race do not admit of any conclusion with regard to racial difference. Since in our quantitative study we shall find additional facts of importance for an understanding of the illusion, we shall defer a general discussion until we have considered the quantitative results.

III. Quantitative Experiments

A. Introduction. The second part of our investigation was a quantitative study of the illusion by the method of equivalents. We sought to discover whether the subjective equation of two cutaneous extents, at places where change of direction in the illusion had been reported, would yield results that could be correlated with the direction of change in the illusion as qualitatively described. There is, it is true, no guarantee that the attitude of judging the relative magnitudes of two cutaneous extents is the same as that of observing relative changes in direction of two moving paths. But, on the other hand, there is no guarantee that the two attitudes are not similar. We ought, therefore, to gain further insight into the psychology of the illusion, regardless of the positive or negative outcome of our quantitative results.

B. Method. The form of the method employed was that laid down by Titchener.[12] As a rule, five points (A, B, C, D, E) were selected, every one of which represented a place of change in the illusion. A standard distance was chosen which was supraliminal for the region.

[12] E. B. Titchener, Experimental Psychology, 1905, i, 77 ff; ii, 187 ff.

This standard was first placed at A, and the equivalent values were found for AB, AC, AD, AE. This group we shall call the A group. We then took the equivalent value for B, and employed it as a standard in the B group; *i.e.*, we obtained the equivalent values for BC, BD, BE. We then took the value for C, found in the A group, and determined the equivalent values for CD and CE. Finally, we took the value for D found in the A group, and obtained the equivalent values for DE. All of the standards except the first were taken from the first space-order. Each time-order contained ten series, five ascending and five descending, so that each space-order contained in all twenty series, making forty series in the total experiment. The instrument employed was the Griesbach aesthesiometer with the same points of hard rubber and with the same amount of pressure as in our qualitative experiments. At the beginning of every series there were two signals, 'ready,' and 'now;' only one of these, 'now,' was used for the applications of the stimulus within a series. The interval between the 'ready' and 'now' was two sec.; the duration of a stimulation, one sec.; the interval between stimulations, one sec.; and that between series, about four secs.

C. The Regions Examined. (1) *From Lips to Ear.* Since the course of the illusion was the same on both sides of the face, we applied the method of equivalents to the left side only. According to our plan, the following places were chosen: A, center of lips; B, half-way between the centre and corner of lips; C, corner of lips; D, half-way between corner and ear; E, 1 cm. from ear. The observers for this region were E. G. Boring (B) and Miss F. A. Bean (Be). (2) *From Top of Upper-arm to Finger Tips (volar side).* The places of change were: A, upper-arm, two-thirds distance from axilla to elbow; B, elbow-joint; C, wrist; D, palm (near mounds); E, finger-tips. In working on the fingers, when it was impossible to use large separations of the points on the two middle fingers, we had recourse to the first and third fingers. The standard distance was 40 mm. (for M, 35 mm.). There were five observers, B, Bo, Ca, D and M. (3) *Volar Side of Upper Arm, Axilla and Side to Hip.* Only four places were chosen in this region: A, upper arm (11 cm. above elbow); B, axilla; C, ribs (16 cm. from axilla); D, waist (10 cm. below C). The observers were Miss E. Alspach (A) and E. The latter, however, completed only the A group. The standard distance was 55 mm. (4) *From Sternum over Left Side of Trunk, Shoulder to Spine.* The five places were: A, sternum; B, middle of left breast; C, left side; D, shoulder, one-half distance between the side and spine; E, spine. The observers were C and W. S. Foster (F). The standard distance was 55 mm. (5) *Dorsal Side of Leg-foot, Upper Leg to Heel, over Sole to Toes.* The points selected were: A, upper leg, two-thirds distance from knee to buttocks; B, knee-joint; C, lower leg (15 cm. from knee); D, near ankle (11 cm. from tip of heel); E, sole of foot (5 cm. from the first toe). The observers were A and E. The standard distance for A was 55 mm., for E 70 mm. (55 mm. was too small a distance to give a perception of two points).

D. The Results. In Tables XVI-XX we give the equivalence ratios for every point examined in every group of the five regions. We also give the principal errors for each of the two space-orders, and the two time-errors for each of the two space-orders. The former is the difference between the

standard and the average of the two equivalent values found for each time-order. This value may, therefore, be taken as the measure of the illusion in relation to the standard of its group. In these errors the minus sign means that the equivalent value was less than the standard; in the time-errors the same sign means that the value of the first is less than that of the second time-order.

In Table XXI we give the quotients not only of all ratios found by experiment in every group (first space order), but also those computed from the ratios of earlier groups. *E.g.*, in the B group the computed value (C) of b/c is the reciprocal of a/b over b/c of the A group. In the C group there are two computed values, the first from the A, the second from the B group. The degree of approximation of the computed to the found quotients for any ratio offers a measure of the reliability both of the observer and of the method.

TABLE XVI

EQUIVALENCE FOR FIVE POINTS—LIPS TO EAR

Observer B.		Principal errors		Time errors	
		I	II	I	II
a and b	30.0 : 29.6 :: 28.9 : 30.0	—0.4	—1.1	—0.7	—1.1
a and c	30.0 : 31.2 :: 28.6 : 30.0	+1.2	—1.4	—2.5	—0.7
a and d	30.0 : 38.8 :: 20.4 : 30.0	+8.8	—9.6	—0.1	—0.6
a and e	30.0 : 36.7 :: 21.8 : 30.0	+6.7	—8.2	—1.4	—2.2
b and c	29.6 : 31.1 :: 26.7 : 29.6	+1.5	—2.9	—2.8	—0.9
b and d	29.6 : 39.3 :: 16.1 : 29.6	+8.2	—13.5	—0.5	—1.35
b and e	29.6 : 37.1 :: 16.3 : 29.6	+7.5	—13.3	—0.5	—0.2
c and d	31.2 : 36.7 :: 22.3 : 31.2	+5.5	—8.65	—1.1	+1.5
c and e	31.2 : 35.2 :: 23.5 : 31.2	+4.0	—7.7	—1.0	—0.9
d and e	38.8 : 38.5 :: 36.9 : 38.8	—0.25	—1.85	—0.35	—0.95
	Observer Be.				
a and b	30.0 : 31.7 :: 27.7 : 30.0	+1.75	—2.3	—0.45	+1.0
a and c	30.0 : 34.3 :: 28.4 : 30.0	+4.35	—1.6	—2.15	—1.9
a and d	30.0 : 37.0 :: 17.6 : 30.0	+7.0	—12.4	+0.85	—1.4
a and e	30.0 : 40.6 :: 17.9 : 30.0	+10.6	—12.1	—0.55	0.0
b and c	31.7 : 34.4 :: 24.2 : 31.7	+2.6	—7.5	—0.85	+0.5
b and d	31.7 : 39.5 :: 16.9 : 31.7	+2.7	—14.9	—1.0	+0.12
b and e	31.7 : 43.4 :: 20.4 : 31.7	+11.6	—11.4	—0.67	—1.6
c and d	34.3 : 45.4 :: 23.5 : 34.3	+11.0	—10.8	—1.15	—1.2
c and e	34.3 : 43.5 :: 21.5 : 34.3	+9.1	—12.8	—1.0	—2.25
d and e	37.0 : 36.4 :: 39.5 : 37.0	—0.67	+2.45	—0.31	—1.75

(Only four series in a time-order for groups B, C, and D.)

TABLE XVII

EQUIVALENCE FOR FIVE POINTS—VOLAR SIDE OF ARM-HAND

Observer Bo.		Principal errors		Time errors	
		I	II	I	II
a and b	40.0 : 45.0 :: 33.4 : 40.0	+5.0	−6.5	−2.7	−2.85
a and c	40.0 : 29.4 :: 51.7 : 40.0	−10.55	+11.7	−3.6	−5.85
a and d	40.0 : 27.2 :: 51.2 : 40.0	−12.8	+11.2	−2.4	−1.05
a and e	40.0 : 22.2 :: 52.4 : 40.0	−17.7	+12.4	−1.0	−2.3
b and c	45.0 : 32.6 :: 62.0 : 45.0	−12.4	+17.0	−0.1	−0.25
b and d	45.0 : 23.5 :: 56.2 : 45.0	−21.5	+20.2	−1.5	−1.25
b and e	45.0 : 13.4 :: 57.7 : 45.0	−13.4	+12.7	−0.1	−1.25
c and d	29.4 : 29.4 :: 30.1 : 29.4	0.00	+0.7	−0.85	−2.12
c and e	29.4 : 27.1 :: 36.1 : 29.4	−2.32	+6.7	−0.6	−1.37
d and e	27.2 : 19.7 :: 32.4 : 27.2	−7.45	+5.2	−0.5	+0.37
	Observer Ca.				
a and b	40.0 : 44.1 :: 37.0 : 40.0	+4.1	−2.95	0.00	+0.55
a and c	40.0 : 29.1 :: 50.2 : 40.0	−10.9	+10.2	−0.12	−1.1
a and d	40.0 : 15.4 :: 53.1 : 40.0	−15.4	+13.1	−3.5	−0.5
a and e	40.0 : 13.6 :: 53.9 : 40.0	−13.6	+13.9	−0.45	−1.35
b and c	44.1 : 24.9 :: 58.2 : 44.1	−19.1	+14.1	+0.45	+1.65
b and d	44.1 : 20.1 :: 54.3 : 44.1	−24.0	+10.2	+2.8	+1.0
b and e	44.1 : 25.5 :: 54.0 : 44.1	−18.6	+9.9	−1.35	−0.25
c and d	29.1 : 33.7 :: 22.3 : 29.1	+4.6	−6.7	−1.9	−0.65
c and e	29.1 : 23.9 :: 34.6 : 29.1	−5.2	+5.5	+0.3	−1.65
d and e	24.6 : 18.1 :: 32.4 : 24.6	−6.4	+7.8	+0.95	−1.45
	Observer D.				
a and b	40.0 : 37.0 :: 40.1 : 40.0	−3.0	+0.1	−3.2	−1.0
a and c	40.0 : 21.7 :: 39.8 : 40.0	−19.3	+0.1	−2.3	−4.4
a and d	40.0 : 26.9 :: 45.5 : 40.0	−13.1	+4.45	−5.0	−2.5
a and e	40.0 : 15.5 :: 46.3 : 40.0	−25.5	+3.6	−1.4	−1.85
b and c	37.0 : 26.7 :: 55.5 : 37.0	−10.25	+18.3	−0.35	−1.55
b and d	37.0 : 23.2 :: 58.6 : 37.0	−13.8	+21.6	+0.05	−0.3
b and e	37.0 : 17.0 :: 51.7 : 37.0	−20.0	+14.7	−1.8	−1.4
c and d	21.7 : 18.8 :: 24.5 : 21.7	−2.9	+2.8	0.00	+0.05
c and e	21.7 : 12.1 :: 31.8 : 21.7	−9.6	+10.1	−0.6	−1.1
d and e	15.5 : 13.8 :: 23.1 : 15.5	−1.7	+7.6	−1.0	−0.9

TABLE XVII—*Continued*

EQUIVALENCE FOR FIVE POINTS—VOLAR SIDE OF ARM-HAND

Observer B.					
a and b	40.0 : 46.9 :: 33.7 : 40.0	+6.95	—6.25	—3.15	—0.85
a and c	40.0 : 22.6 :: 51.0 : 40.0	—17.4	+11.0	—1.1	—2.1
a and d	40.0 : 24.6 :: 60.1 : 40.0	—15.3	+20.1	—1.85	—1.85
a and e	40.0 : 19.0 :: 60.2 : 40.0	—21.0	+20.2	—2.7	+0.3
b and c	46.9 : 31.7 :: 61.9 : 46.9	—15.2	+14.9	—1.5	—2.12
b and d	46.9 : 33.1 :: 56.3 : 46.9	—13.8	+9.4	—1.12	—0.12
b and e	46.9 : 22.4 :: 60.0 : 46.9	—24.6	+13.0	—0.6	+0.5
c and d	22.6 : 17.2 :: 31.2 : 22.6	—5.4	+8.6	+0.5	—0.25
c and e	22.6 : 11.5 :: 33.2 : 22.6	—11.1	+10.6	+0.5	+0.75
d and e	24.6 : 23.9 :: 33.7 : 24.6	—0.8	+9.1	—1.37	0.00
Observer M.					
a and b	35.0 : 40.0 :: 30.8 : 35.0	+5.0	—4.2	—0.2	+0.5
a and c	35.0 : 27.4 :: 41.6 : 35.0	—7.6	+6.6	—0.9	—0.55
a and d	35.0 : 24.6 :: 41.1 : 35.0	—10.3	+6.1	—0.65	—2.95
a and e	35.0 : 22.5 :: 47.0 : 35.0	—12.4	+12.0	+1.35	—1.2
b and c	40.0 : 34.0 :: 48.6 : 40.0	—6.0	+8.6	—1.5	—3.35
b and d	40.0 : 29.0 :: 45.7 : 40.0	—10.9	+5.7	—0.45	—1.2
b and e	40.0 : 26.1 :: 54.4 : 40.0	—13.9	+14.4	—2.0	—3.8
c and d	27.4 : 24.8 :: 32.5 : 27.4	—2.6	+5.1	—1.1	—0.9
c and e	27.4 : 16.2 :: 36.3 : 27.4	—11.2	+8.9	—0.3	—0.85
d and e	24.6 : 17.1 :: 29.9 : 24.6	—17.5	+5.2	+1.3	—0.6

TABLE XVIII

EQUIVALENCE FOR FOUR POINTS—VOLAR SIDE OF UPPER ARM, AXILLA, SIDE

Observer A		Principal errors		Time errors	
		I	II	I	II
a and b	55.0 : 44.0 :: 64.6 : 55.0	—10.9	+9.6	—7.35	—1.15
a and c	55.0 : 36.0 :: 68.4 : 55.0	—19.0	+13.4	0.00	—1.25
a and d	55.0 : 32.5 :: 64.3 : 55.0	—22.4	+9.3	—3.15	—1.45
b and c	44.0 : 53.7 :: 43.4 : 44.0	+9.6	—0.65	—1.6	—0.3
b and d	44.0 : 46.2 :: 34.1 : 44.0	+2.1	—9.9	+1.3	—3.6
c and d	36.0 : 34.0 :: 40.1 : 36.0	—1.9	+4.1	—0.25	—4.6
Observer E.					
a and b	55.0 : 45.38 :: 65.0 : 55.0	—9.62	+10.0	—0.12	—1.00
a and c	55.0 : 24.12 :: 77.13 : 55.0	—30.87	+22.13	—0.85	—1.62
a and d	55.0 : 37.88 :: 62.75 : 55.0	—17.12	+7.75	—3.62	0.00

TABLE XIX

EQUIVALENCE FOR FIVE POINTS—BREAST AND BACK

Observer C.	Principal errors		Time errors	
	I	II	I	II
a and b 55.0 : 57.9 :: 39.8 : 55.0	+2.9	—15.1	—9.3	—5.35
a and c 55.0 : 65.6 :: 41.9 : 55.0	+10.6	—13.0	—14.7	—5.95
a and d 55.0 : 73.8 :: 38.6 : 55.0	+18.8	—16.3	—4.15	—7.45
a and e 55.0 : 74.9 :: 37.2 : 55.0	+19.9	—17.7	+1.15	—4.25
b and c 57.9 : 50.3 :: 83.0 : 57.9	—7.5	+25.1	—4.05	—2.9
b and d 57.9 : 91.5 :: 58.9 : 57.9	+33.6	+1.0	+3.85	—1.5
b and e 57.9 : 69.4 :: 63.2 : 57.9	+11.5	+5.3	—0.85	+0.5
c and d 65.6 : 62.6 :: 78.2 : 65.6	—3.0	+12.5	+4.85	—1.9
c and e 65.6 : 69.6 :: 74.0 : 65.6	+4.0	—8.4	—2.15	—4.5
d and e 73.8 : 88.7 :: 63.2 : 73.8	+14.9	—10.6	+0.75	—1.1
Observer F.				
a and b 55.0 : 37.95 :: 68.55 : 55.00	—17.05	+13.5	+2.25	—0.05
a and c 55.0 : 74.30 :: 42.65 : 55.00	+19.3	—12.35	—2.6	—1.35
b and c 37.9 : 56.40 :: 30.55 : 37.90	+18.45	—7.4	—0.5	+5.55
c and d 74.3 : 48.20 :: 85.55 : 74.30	—3.95	+11.25	+3.5	+8.65
d and e 78.2 : 86.40 :: 76.05 : 78.25	+8.15	—2.20	+1.3	+2.65

TABLE XX

EQUIVALENCE FOR FIVE POINTS—DORSAL SIDE OF LEG-FOOT

Observer A.	Principal errors		Time Errors	
	I	II	I	II
a and b 55.0 : 58.9 :: 63.1 : 55.0	+3.9	+8.15	+0.85	+0.35
a and c 55.0 : 40.3 :: 62.1 : 55.0	—14.6	+7.1	+2.15	—2.2
a and d 55.0 : 18.9	—37.0	.....	+0.75	.....
a and e 55.0 : 26.5 :: 84.3 : 55.0	—28.4	+29.3	—0.65	+0.25
b and c 58.9 : 53.8 :: 64.3 : 58.9	—5.1	+5.3	+2.05	+0.5
b and d 58.9 : 17.4	—41.5	.....	—1.44	.....
b and e 58.9 : 31.3 :: 80.5 : 58.9	—27.6	+21.5	+0.1	—0.5
c and d 40.3 : 25.2	—15.1	.....	+0.65	.....
c and e 40.3 : 37.1 :: 79.5 : 40.3	—3.2	+39.1	+1.05	+1.6
d and e 18.9 : 30.8 :: 12.0 : 18.9	+11.9	—6.4	+1.75	+0.35
Observer E.				
a and b 70.0 : 76.2 :: 70.63 : 70.0	+6.25	+0.63	—0.75	—0.90
a and c 70.0 : 44.1 :: 103.20 : 70.0	—25.90	+33.20	—0.12	—1.25
a and d 70.0 : 33.7	—36.25	.....	—1.00	.....
a and e 70.0 : 32.4 :: 116.50 - 70.0	—32.40	+46.50	—2.37	—0.50

TABLE XXI

COMPUTED AND FOUND RATIOS BY GROUPS

Region and observer	A Group				B Group					
	a/b	a/c	a/d	a/e	b/c		b/d		b/e	
	F	F	F	F	C	F	C	F	C	F
1, B	1.013	0.961	0.773	0.817	0.947	0.952	0.772	0.753	0.806	0.798
1, Be	0.949	0.870	0.810	0.740	0.921	0.930	0.850	0.800	0.918	0.860
2, Bo	0.887	1.358	1.469	1.795	1.531	1.374	1.653	1.912	2.022	1.421
2, Ca	0.907	1.374	1.625	1.519	1.516	1.765	1.794	2.189	1.624	1.725
2, D.	1.081	1.840	1.484	2.579	1.710	1.383	1.372	1.594	2.382	2.172
2, B	0.853	1.769	1.623	2.125	2.073	1.476	1.925	1.415	2.496	2.097
2, M	0.875	1.277	1.421	1.552	1.460	1.176	1.626	1.377	1.779	1.532
3, A	1.251	1.529	1.692	.....	1.220	0.822	1.351	0.955	.....	.....
5, A	0.934	1.362	2.910	2.033	1.461	1.094	3.120	3.372	2.179	1.881
4, C	0.951	0.838	0.745	0.735	0.884	1.152	0.783	0.632	0.773	0.834
3, E	1.213	2.280	1.451	.....	.....	.....	.....	.....	.....	.....
5, E	0.930	1.580	2.071	1.862	.....	.....	.....	.....	.....	.....

Region 1.—Lips to ear.
2.—Upper arm, forearm to fingers.
3.—Volar side of upper arm, axilla, side to waist.
4.—Breast and back (sternum to spine).
5.—Dorsal side of leg over heel and sole of foot.

TABLE XXI—*Continued*

COMPUTED AND FOUND RATIOS BY GROUPS—*Continued*

Region and observer	C Group						D Group			
	c/d			c/e			d/e			
	C	C′	F	C	C′	F	C	C′	C″	F
1, B	0.793	0.815	0.851	0.851	0.838	0.887	1.046	1.056	1.041	1.007
1, Be	0.779	0.740	0.762	0.850	0.800	0.791	0.921	0.930	1.040	1.020
2, Bo	1.388	1.079	1.008	1.321	1.032	1.088	1.228	0.744	1.089	1.378
2, Ca	1.183	1.240	0.862	1.071	0.977	1.235	0.902	0.785	1.436	1.482
2, D.	0.803	1.152	1.154	1.394	1.571	1.791	1.737	1.362	1.552	1.123
2, B	0.919	0.959	1.312	1.208	1.421	1.965	1.319	1.483	1.492	1.032
2, M	1.113	1.170	1.150	1.218	1.320	1.692	1.093	1.119	1.471	1.442
3, A	1.106	1.162	1.162	.....	.....	.....	.....	.....	.....	.....
5, A	2.132	3.040	1.595	1.488	1.721	1.081	0.699	0.566	0.679	0.615
4, C	0.886	0.548	1.049	0.874	0.723	0.942	0.987	1.316	0.898	0.832

Region 1.—Lips to ear.
2.—Upper arm, forearm to fingers.
3.—Volar side of upper arm, axilla, side to waist.
4.—Breast and back (sternum to spine).
5.—Dorsal side of leg over heel and sole of foot.

The tables show the summaries of more than 4,000 single determinations. As data, they are to be judged by the principal errors, the time-errors, and the consistency of computed to found ratios. The differences between the absolute magnitudes of the ratios of individual observers are not, for us, especially significant; we shall be interested rather in the course of the relative magnitudes. Theoretically, the principal errors of the first and second space-orders should approximate to each other with change of sign. As a rule, they are in fact of the same order; the exceptions are not numerous, and save in one instance do not seriously mar the significance of the results.

This one case is found in Table XVII. Here D in group A gives a *minus* value for the first principal error, whereas all other observers in this region give a *plus*. The three remaining values of the group are very large, whereas the corresponding values of the second space-order are very small; and we therefore suspect that the experimenter herself was at fault, that she set the standard distance on the instrument at 35 mm. (the standard for M below), and recorded it as 40. If this change were made the *minus* would become a *plus*,[18] and the two principal errors would balance each other properly. In our later treatment of these results we have, nevertheless, left the values as they stand. As regards the opposition of signs in the principal errors, there are only six instances where the two are of the same sign. In two of these (Tables XVI, Obs. B), the values at fault are within 0.4 mm. of equality and are therefore negligible; two of the others (Table XX) were given by different observers for the same pair of points, and are probably due to the difficulties of perception.

An examination of the time-errors shows that, in general, the variables of the first are less than those of the second time-order: when the standard comes first, the variable is judged as *smaller* than when the variable comes first.

If the judgment of the variable were *easier* when the standard comes first, we should expect the m.v. of the various series to be smaller in the first time-order. We have compared the two sets of m.v. for the five observers in the region of the fore-arm, and we find that the percentages of cases in which the m.v. of the first time-order is less are 70, 60, 30, 65, 65. Since we should expect them to be smaller in 50% of the cases, some other factor is apparently at work.

Turning now to the ratios themselves, we find that they speak even more positively for the reliability of our observers. When it is recalled that the computed ratios are based upon found values, and that in the C and D groups there are two and three computed values, the approximation of these to the found values in these groups must be regarded as in general of a high order. There are, of course, exceptions. The

[18] See D's description of the illusion, Table VII, in which he reports a *convergence* at the elbow.

localization and the judgment of extent are much more difficult in some regions than in others. And some of our observers had had little experience in psychological observation before they came to our experiment. Occasional defects are, therefore, to be expected.

(*a*) *The Equivalence Ratios as Measures of Sensitivity and of the Illusion.* If we may assume that all other factors are equal, then when an equivalent value is equal to the standard, the result should mean equal sensitivity; if greater, it should mean less, and if less, greater sensitivity. Turning to Table XVI, we find the following values for the five points of the A group (1st space-order), for the two observers

	B	Be
A. Center of lips.....	30	30
B. Half-way to corner.....	29.6	31.7
C. Corner of lips.....	31.2	34.3
D. Half-way to ear.....	38.8	37.0
E. 1 cm. from ear.....	36.7	40.6

It is clear that from the center of the lips to the ear there is, for Be, a gradual increase in magnitude of the equivalent values. For B, on the other hand, the curve is not quite so pronounced. The value for point-B is probably equal to the standard (the difference, —.4 mm., is much below the m.v.); and the value for point-E shows a decrease in magnitude over point-D but an increase over the values for A, B, and C. When, however, a direct comparison of D and E is made (in D group), it will be seen that the ratio of the two is within 0.25 mm. of equality. If now we turn to Weber's and Vierordt's description of the relative sensitivity of points in this region, as measured by the two-point limen (Table X, p. 94), we find it to be progressively less. We thus have a first correlation. If, again, we turn to the description of the illusion (Tables I and VI), we find two slightly different accounts: for G, Be and J, a convergence of the paths from center to corner of lips and from that point a convergence to the ear; for Bo paths parallel from corner of lips to ear. Since, as we have already seen (p. 97), a convergence of paths corresponds with a decrease in sensitivity, the equivalent values for Be are, in a sense, measures of the illusion as reported by Weber, G, Be, and J; while B's values are, perhaps, measures of the illusion as reported by Bo.

We obtain a similar result if we take the equivalent values for the fore-arm. Instead, however, of comparing separately the results of the five observers, we will average the values for all observers at every point of the A group and correlate these averages with differences in sensitivity and with the illusion.

A. ⅓ of distance above elbow.....	40
B. Elbow	43.6 ± 2.8
C. Wrist	27.0 ± 3.9
D. Palm	24.7 ± 3.8
E. Finger tips	19.5 ± 3.8

The general curve of sensitivity is unmistakable; there is first a decrease to the elbow, then an increase to the finger tips. The only question concerns the significance of the difference between wrist and

palm in view of the size of the m.v. Let us, however, turn to the description of the illusion. We find its course described first as parallel, then converging at elbow, then diverging at wrist, then slightly converging at palm and finally diverging or parallel to finger-tips. The single discrepancy between the two sets of results is at the palm; here, according to the averages, we should have a slight divergence or parallelism instead of convergence. The obvious conclusion, supported by the size of the m.v., points to individual differences which are masked by the averages. D, in fact, shows greater sensitivity at the elbow and thus a divergence; and both D and M show a decrease in sensitivity at the palm and so a convergence. All other observers show less sensitivity at the elbow and greater at the palm.

It would, perhaps, be fairer both to the equivalent values and to the illusion if (1) instead of taking the equivalences to the standard of the A group we take those to every standard of the various groups, and if (2) instead of selecting differences between standard and equivalent we take their quotients as measures of sensitivity. If, *e.g.*, the ratio a/b equals 1, the sensitivity for the two points is equal; if again, a/b is less than 1, then the sensitivity of a is less, and if greater then the sensitivity of a is greater than that of b. Turning then to the table of quotients, we take the 'found' values for a/b of A group, b/c of B group, c/d of C group, and d/e of D. group, for every one of the five observers, and average them; we obtain the following results:

elbow	a/b	0.92c±.063	= less sensitivity = convergence
wrist	b/c	1.435±.148	= greater sensitivity = divergence
palm	c/d	1.097±.130	= slightly greater = divergence or parallel
finger-tips	d/e	1.291±.171	= greater sensitivity = divergence

Aside from the critical point at the palm, the correlation both for sensitivity and for the illusion still holds. As regards the palm, the size of the m.v. again points to equal sensitivity with the wrist. In this connection it may be recalled that, when we compared the course of the illusion with measures of sensitivity as given by Weber and Vierordt (p. 97), we found that, where the sensitivity of two points is approximately the same, there the course of the illusion may be described as converging, parallel, or diverging. The change in direction is always slight, however, and may well be due to secondary factors. There is one other slight discrepancy in the above averages, namely, the size of the ratio for the finger-tips. Since the illusion is frequently parallel at this point, the value is larger than we should expect. The reason is that, when the standard (or variable) distance was too large to go on the two middle fingers, it was placed on the first and third fingers.

The values for two of the three remaining regions give similar results. In that of upper arm, axilla, ribs, and waist, the two observers agree in giving values that show correlation both in sensitivity and in change of direction of the paths for all points except the waist. At this latter point, E shows a decided decrease in sensitivity and convergence, whereas A shows a slight increase and divergence.[14] In the leg-foot region the two observers give results that correspond with the illusion throughout. Below the knee the divergence represented by the equivalent values is much greater than it was reported

[14] See Table V, where it is shown that the author found a convergence and Weber a divergence at this region.

to be in the illusion, since the paths were occasionally reported as parallel; otherwise there is complete correspondence. The values for the breast-back region are less satisfactory. C reports a decrease in sensitivity for the points sternum-nipple, whereas in the illusion she reports divergence of the paths. For the next point (side of breast) in the A group she gives a decrease in sensitivity, as we should expect, but in the B group she reverses this result. F, on the other hand, conforms to the illusion as described; *i. e.*, an increase in sensitivity from sternum to nipple, a decrease to side of breast, an increase to shoulder, and a decrease from shoulder to spine. Unfortunately, the experiment with F was not completed in detail, so that we are unable to work out the quotients of the various groups. The results of C are readily explained from her reports. She not only found it much more difficult to localise the two points than in the qualitative experiments, but she also frequently reported the presence of three or more pressure sensations instead of two, and in the latter case she chose the two that were 'most distinct' upon which to base her judgment.

In what sense, we may now ask, are the equivalent values measures of the illusion? In answering this question two facts should be kept in mind. First, we have individual differences; all investigators have agreed that there are large individual differences in sensitivity as measured by the two-point limen, and our observers have shown individual differences in the magnitude of the equivalent values. We have also found individual variations in descriptions of the illusion. Secondly, we have no way of directly comparing the relative magnitude of the equivalent value at a point and that of the separation of the two paths at that point. We have only occasional observations volunteered by the observers, and our study of the objective data, upon which to base a conclusion. We may say, then, that since at times our observers have reported the relative magnitude of the extent under the one attitude as sometimes larger and sometimes smaller than that under the other attitude, and since we have found a high correlation between equivalent values and the course of the illusion, the former is the measure of the latter very much as a smoothed curve is the measure of a curve plotted by points. In support of this analogy, it may be said that we never find the course of the paths making abrupt changes in direction; even where the convergence or divergence is described as 'quick,' it is always 'smooth.' The analogy must not, however, be taken too literally; the equivalents actually measure the illusion inversely; the plotted curve should, therefore, be reversed; and even then the smoothed curve would represent only one of the two paths.

IV. Conclusion: The Psychology of the Illusion

Psychologically, the illusion is a perception of two cutaneous extents whose relative locality and direction change in the perception's course. This change in direction, or in distance between the two extents, is the characteristic feature of the perception. The conditions of the experience are not simple; but the results of our study seem to show that the essential factors are two in number: (1) differences in sensitivity of the cutaneous surface, and (2) continuous movement of a two-point stimulus. The influence of the former

is evidenced by the high correlation between course of the paths and degree of sensitivity as measured by the two-point limen, and also by our own correlation between equivalence ratios and sensitivity on the one hand and course of the paths on the other. The importance of the second factor is shown by the fact that with discontinuous movement the illusion is absent. In accepting these two as primary, we necessarily disallow other factors which have been thought to condition the illusion. Since the congenitally blind individual may have the perception, we cannot regard visualization as an essential, although in the normal individual it is a frequent component of the experience. We cannot either accept the view that relative ease of localization and degree of distinctness are necessary conditions of the illusion. In the first place the high correlation between these factors and degrees of sensitivity, and change in course of the paths, implies a single physiological basis; and we may assume that in general the common factor is sensitivity, without assuming that ease of localization and distinctness of impression have no other condition (such as, for example, intensity of stimulus, attention). In the second place we have one instance, at least, where the factor of the moving stimulus cuts across the secondary factors of ease of localization and distinctness, so that the typical illusion occurs in direct opposition to distinctness of impression;[15] and the equivalence ratio obtained with an unmoved stimulus in its turn shows directly the influence of distinctness. Indeed, it seems reasonable to suppose that both distinctness of experience and visualization, when they are independent of sensitivity, are much more frequently operative with an unmoved than with a moved stimulus. We do not believe, therefore, that Judd is justified in arguing from certain equivalence ratios, obtained by Camerer, to the Weber Illusion. Our results seem to show that, on the contrary, these factors function as secondary conditions. In our qualitative experiments the only certain evidence we found for factors other than sensitivity and movement of stimulus was: (1) where the sensitivity of two points is 'approximately the same,' there we may find the paths parallel, or diverging, or converging; (2) where the rate of movement is too slow to give rise to the typical illusion, there we find new intermediate convergences and divergences which are irregular and instable; and (3) the illusion is much more stable and uniform in the normal than in the blind individual. The first two

[15] See the reports of C, pp. 103, 117.

of these results may well have resulted from such conditions as ease of localization, distinctness of impression, visual imagery, etc., when the one or the other of the essential conditions is in abeyance. The third seems to mean that visual imagery serves to stabilize the illusion.[16]

V. Summary

1. Weber's illusion has been found on 24 of 42 regions of the body; it occurs more frequently in the longitudinal than in the transverse direction; and, aside from slight individual differences, it is the same in form for all normal observers.

2. The illusion is apparently conditioned upon differences of cutaneous sensitivity, and upon continuous movement of the two-point stimulus. The optimal rate of movement lies between 4 and 12 cm. per sec. Visualization, and distinctness of impression, may occur as secondary conditions; but since the illusion is found with congenitally blind observers, and also in direct opposition to distinctness of impression, neither is an essential factor.

3. Equivalence ratios, determined by the Method of Equivalents for places that correspond with points of change in the illusion, furnish a measure of the illusion in the sense that an increase in an equivalent value corresponds with a convergence, a decrease with a divergence, and an equality with a parallel course of the paths.

[16] We have stated the details and cited the references above, p. 99. M. F. Washburn, Ueber den Einfluss der Gesichtsassociationen auf die Raumwahrnehmung der Haut, *Phil. Stud.*, xi, 1895, 190 ff., had shown that Camerer's equivocal results were due to visualization; a finding which has since been confirmed by Gemelli, *op. cit.*, 133-177, 282. Judd, however, seems to have rejected Washburn's explanation on the ground that not all observers have visual imagery; he accordingly substituted 'Deutlichkeit.'

A CHECKING TABLE FOR THE METHOD OF CONSTANT STIMULI[1]

By GILBERT J. RICH, Hobart College

In the computation of a limen, according to the *phi-gamma* hypothesis, from data obtained by the method of constant stimuli (or the method of constant stimulus differences), one finds for every stimulus (or stimulus difference) employed the five values: P, γ P, xP, xxP, and x γ P.[2] It is then necessary to obtain the sum of each one of these five values for all of the stimuli used, namely: [P], [γP], [xP], [xxP] and [xγP]. It is frequently desirable to check the required additions, which, since both positive and negative quantities occur, are especially liable to error. The simplest procedure for checking,[3] known as 'cross-addition,' consists in finding for every stimulus the total of the five values (a total which we shall designate by the symbol 'T'). If no mistakes have occurred in the additions, the sum of the T-values thus obtained will equal the total of the five sums [P], [γP], [xP], [xxP], and [x γP].

But the five values mentioned, which are obtained for every stimulus, depend solely on the x and the p (percentage of judgments) for that particular stimulus. If Urban's tables[4] are used we are limited to 15 possible x's (—7 to 7) and 99 possible p's (.01 to .99). There are, then, only 1,485 possible combinations[5] of p and x, and only that number of possible values of the quantity T under these conditions.

The accompanying checking table[6] contains the values of T just mentioned for every x and every p. Every value of T in the table is the sum of the five values P, γ P, xP, xxP, and x γ P for the corresponding x and p, as given in Urban's tables. Every line of the table contains

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[1] From the Department of Psychology, Cornell University.

[2] For the general procedure in these computations see: E. B. Titchener, *Experimental Psychology, Quantitative Student's Manual*, 92 ff., and E. G. Boring, Urban's Tables and the Method of Constant Stimuli, *Amer. Jour. Psych.*, 28, 1917, 280 ff.

[3] The method used by Fernberger and by Urban, and described by Boring, *op. cit.*, 288, involves more labor than does mere 'cross addition,' but localizes more closely any possible errors. Its use here, however, would require two tables instead of our one.

[4] F. M. Urban, Hilfstabellen für die Konstanzmethode, *Arch. f. d. ges. Psych.* 24, 1912, 236 ff. and 25, Literaturber, 84; *Die Praxis der Konstanzmethode*, Leipzig, 1912.

Directions for using these tables will be found in Boring, *op. cit.*

[5] Since $15 \times 99 = 1{,}485$.

[6] I am indebted to my former associates in the Cornell Laboratory, Miss J. M. Gleason, Dr. E. G. Boring, Dr. W. S. Foster, Mr. L. B. Hoisington, and Mr. H. G Bishop for much valuable assistance in the preparation of this table; and to Miss K. M. Schutt of Ithaca for her careful work in typing the copy reproduced here.

the T's for every x used by Urban and a single p, while every column contains the T's for every p and a single x.[7]

The use of the checking table is simple. After obtaining from Urban's tables the five values required for a given stimulus (or stimulus difference), the T for that stimulus, as determined by its x and p, is read from our table and placed in a sixth column. (Note that T is not the same for p and 1.00—p.) The same procedure is followed for every stimulus involved in the calculation. The sum of this sixth column is found just as the sums of the five other columns. If there are no mistakes in computation, the sum of the T-column will be equal to the sum of the sums of the other five columns. For, since each T is obtained according to the formula,

$$T = P + \gamma P + xP + xxP + x\gamma P,$$

it follows that

$$[T] = [P] + [\gamma P] + [xP] + [xxP] + [x\gamma P].$$

If, however, the sum of the T-column is not equal to the sum of the other five columns, a mistake has been made. There are two possible sources of error. One possibility is that one or more of the additions is wrong; the other is that an error has been made in copying from either Urban's tables or the checking table. In practice, the writer has found most of his discrepancies to be due to the latter cause.

In building the checking table, we used Urban's tables as published in *Die Praxis der Konstanzmethode*, 1912, which contains two corrections of the tables as originally published in the *Archiv* (for 6^2P when $p = .89$ and .90). In the course of our work, another error in Urban's tables (both editions) came to light. The value 5^2P when $p = .90$ is given as 14.4388 and should be 13.4388. We used the corrected value, and our table will show this discrepancy from either edition of Urban.

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[7] The values of T were themselves checked by finding the sum of each column in our table. It can readily be shown that the sums of two columns of T, having x's numerically equal but different in sign, differ by 2 [xP]. The columns in our table were required to show this difference as a criterion of correctness.

NOTE

DR. MORGAN ON THE MEASUREMENT OF ATTENTION

By K. M. Dallenbach

In the introduction to his work on "The Overcoming of Distraction and Other Resistances" (*Archives of Psychology*, no. 35, 1916) Dr. J. J. B. Morgan offers some criticisms of my paper on the measurement of attention (this Journal, 24, 1913, 465 ff.), which call for a reply.

(1) The principal criticism is as follows (p. 8). "Because this correlation [between clearness-scale and speed and accuracy of work] was rather high the conclusion was drawn that the true measure of attention is a subjective scale of clearness. Such a conclusion presupposes that the amount and precision of the work was influenced only by changes in attention. This could not be known unless all practice, fatigue and feeling factors were eliminated. But supposing that the experimenters had eliminated all these (which they certainly did not), why not take the amount and precision of the work as a measure of attention directly and not by a roundabout procedure, involving endless difficulties, adopt a measure which is from the very nature of it much less precise?"

A reader of these sentences would hardly guess that the 'presupposition' referred to is practically a quotation from my own paper. The conclusion which I draw from my experimental results holds, I say, provided that certain things are true; and one of these things is "that the work itself is not influenced by anything other than a change in the attention" (p. 499). This, my critic affirms, cannot be known unless practice, fatigue and feeling are eliminated. The suggestion again comes from my paper. I sought to stabilise practice by a three months' drill (p. 472). I sought to prevent fatigue by frequent rests and a division of the experiment (p. 474); the duration of the single observation was 30 to 60 seconds (pp. 474, 493 f.); and only five or six of these observations were made in the hour (pp. 474, 492). I sought to control feeling by requiring a report of affective mood (p. 492) from observers specially trained in introspection (p. 467). If dogmatism were at all permissible in science, it would be nearer the truth to say that the experimenters *did* eliminate these sources of error than to say, as Dr. Morgan roundly declares, that they did *not*. I should be unwilling to dogmatise on either side; but I point out that Dr. Morgan's criticism does not bear upon omissions of my work, but simply denies that I have succeeded in doing what I very carefully tried to do. What his grounds for denial are, I do not know.

Nor do I know how a method of direct, face-to-face observation can be termed 'roundabout.' To measure attention by something else, that is not attention, would be roundabout; to lay a scale of observational measurement upon the attentive state itself is, I should suppose, the most direct course that an experimenter could follow.

But I could not, in any case, measure attention by "amount and precision of the work." Dr. Morgan will hardly maintain in serious-

ness that amount and precision of work are, in general, influenced by nothing else than attention. And even if that procedure were legitimate, my problem was to measure attention in terms of clearness.

(2) Yes, rejoins Dr. Morgan, in terms of a theory! "Experimental work instead of seeking to sift down facts has been used to support one theory or another" (pp. 1 f.). I do not see how an experimental problem can even be formulated without some sort of preceding theory or hypothesis. But I can assure Dr. Morgan that my results would have been published if they had negated the hypothesis which they were meant to test. I think that I have brought out facts of observation, and I think that they confirm the hypothesis in question. If Dr. Morgan can show that they support any other and contradictory hypothesis, I shall endeavor to test that.

(3) A minor point of criticism concerns Wundt's rule for the choice of distractors within the sense-department. Dr. Morgan asserts that I distracted from the tone of a variator by "sounds varying from a metronome to a graphophone" (pp. 4, 8 f.). Would the reader gather from this account that I used eight sets of distractors, including flicker (9 rhythms and 4 intensities) and the electrical current (3 intensities)? Or that phonograph and metronome were the *only* sound-distractors that I employed? Or that I have stated the order of effectiveness of the distractors, in the light both of my objective results and of the observers' reports (pp. 472, 488)? If Dr. Morgan really thinks that the use of the phonograph brought the sound of the variator anywhere near the differential limen (which is the gist of Wundt's rule), my own and my observers' experience proves that he is mistaken.

(4) Dr. Morgan makes me conclude that "since the only way to measure clearness is introspectively, therefore introspection must be the only measure of attention" (p. 2). I nowhere draw that conclusion. The dogmatism is, again, Dr. Morgan's and not mine.

BOOK NOTES

The sense of taste. By H. L. Hollingworth and A. T. Poffenberger, Jr. New York, Moffat, Yard and Co., 1917. 200 p.

This book attempts to give a kind of bird's-eye view of what we know of the sense of taste, in fourteen chapters, its qualities, organization, sensitiveness, relation of qualities, the organ, experiments on the taste mechanism, substances that produce it, functions of the mechanism, development in the individual, evolution of taste, gustatory imagination and memory, unusual and abnormal taste experiences, food and flavor, and finally, the esthetic value of taste. The authors have here given us a pretty well proportioned survey of these very diverse aspects of the study of this subject, but in looking over such a handbook one is very strongly impressed with the extremely superficial character which is inseparable from such a plan, with from one to three or four pages each on such subjects as the evolution of taste, the Pawlow studies, the abnormal tastes, discussions of the relation of food and flavor. As we need broader synthetic views in psychology such a book as this is worth while. It has to be very dry and general, a mere setting into juxtaposition a lot of facts which are not much correlated with each other or with life.

Our more specific and emphatic criticisms of this book are, first, that so far as the writer has noticed, there is not a single reference and for a book of this kind, which has to be little more than a list of topics, this makes the book practically worthless. The pupil has no guide and the teacher no incentive to go outside these pages, and to cram them up without following the sidelights would be about as worthless and antipedagogical work as could well be conceived. The other criticism is that in these days of applied psychology, and when the applications of a psychology of taste are so many and great, there is no allusion to these. Indeed, so careful have the authors been not to touch applied psychology, that their section on flavors and foods in this day of Pawlow is an anachronism. It is difficult to see for whom such a book was intended or whom it will help.

The origin and evolution of life, on the theory of action, reaction, and interaction of energy. By Henry Fairfield Osborn. New York, Charles Scribner's Sons, 1917. 322 p.

This is a very able and competent presentation of the physico-chemico theory of not only the development but the origin of life. The author assumes that biologists have been too provincial in applying only principles from their own department, whereas the time has now come when they must lay new and more solid foundations in the physical sciences. He carries his study through the general field of the evolution of life, showing that vitalism has no place.

Nietzsche, the thinker; a study. By William Mackintire Salter. New York, Henry Holt and Co., 1917. 539 p.

The author was for a long time one of the leaders in the ethical culture movement, and has made a surprisingly minute study of Nietzsche, more thorough, perhaps, than any other in any language.

The reader of this will have a pretty good idea of Nietzsche's position on most subjects; unfortunately, however, not on all. The author has not brought to the fore Nietzsche's extreme negative attitude toward Christianity. We do not quite understand why. Another criticism of the book is that the author has apparently not made the slightest concession to the modern psychoanalytic method of treatment. He has confined himself to a very pragmatic, lucid, and well-arranged picture of Nietzsche, largely from his own phraseology.

The romance of escapes; studies of some historic flights with a personal commentary. By TIGHE HOPKINS. Boston, Houghton Mifflin Co., 1917. 395 p.

This is a comprehensive survey of escapes in general, and the author shows that there are points where fiction cannot enter; that there are great moments; that great escapes are rare. Coming closer to his subject, he discusses escapes from the Inquisition, from Siberia to Paris, Rough Riders, the Boers, Louis Napoleon's passage from exile to Emperor, prisoners of war, escapes from the revenge of Robespierre, the Empress Eugénie and the dentist, the first man who broke the Bastille. These are certainly thrilling tales.

The Jesus of history. By T. R. GLOVER. New York, George H. Doran Co. (c. 1917). 225 p.

This book grew out of lectures given in many cities of India during the winter of 1915-16. They were taken down in shorthand at Calcutta and revised in Madras, and here and there other articles are incorporated. He treats of Jesus' childhood and youth, the man and His mind, teachers and pupils, Jesus' teaching about God, man, sin, choice of the cross, the church in the Roman Empire, Jesus in Christian thought.

Records of the life of Jesus. Book I: The record of Mt-Mk-Lk. Book II: The record of John. By HENRY BURTON SHARMAN. New York, George H. Doran Co. (c. 1917). 319 p.

This book is a very useful kind of gospel harmony and is apparently well up-to-date. The method of parallel columns for the synoptic gospels is the same as was adopted long ago by Robertson; while the fourth gospel is separated and treated by itself. It is a very convenient form of colligating the material of the gospels and will be welcomed by scholars.

Educational psychology. By KATE GORDON. New York, Henry Holt and Co., 1917. 294 p.

This book is designed for students of pedagogy in colleges and normal schools, and pre-supposes an elementary knowledge of psychology. It treats of the growth of human structure, behavior, instinct, motor and sensory capacities, the learning process, imagination, observation and report, memory, reason, syllogism, transfer of training and of ideas, attention, feeling, will, psychology of language-teaching, drawing, and arithmetic.

Mankind; racial values and the racial prospect. By SETH K. HUMPHREY. New York, Charles Scribner's Sons, 1917. 223 p.

This volume of papers is devoted to such topics as the principles of inheritance, its significance, birth-rate and race values, deficient

increase of the superior, excessive increase of the inferior, human values in reserve and their exhaustion, rise of the Aryan, the nations at war, Germany, America as the melting-pot, the relations of negro and white, the labor immigrant, and finally, eugenics. The book is untechnical, and is based on the fundamental conception that all is not well with the human race but that it can be bettered.

An introduction to special school work. By MARION F. BRIDIE. New York, Longmans, Green and Co., n. d. 238 p.

This is devoted to the education of mentally deficient children, and treats of understanding, preparatory class, sense-training, reading, oral lessons, the manual-oral class, number work, physical training, junior manual training, vocational training for boys and for girls, school organization.

How children learn. By FRANK N. FREEMAN. Boston, Houghton Mifflin Co. (c. 1917). 322 p.

This is a study in applied psychology. It begins with the nervous system, then discusses the relation of native and acquired responses, the native being play, imitation and self-assertion, instinctive social attitudes and types, speech, acquiring skill, building up perception, association and memorizing, problem solving or thinking, general principles regarding the child's mental development, transfer of general training, mental economy and control, mental hygiene.

Psychology; general introduction. By CHARLES HUBBARD JUDD. Boston, Ginn and Company, (c. 1917). 358 p.

This is a revised edition, which we are told has been largely rewritten. The author flatters himself that the emphasis he laid on motor processes in the edition of 1907 was more than justified by behaviorism. The present edition goes yet further in this direction, expanding the doctrine of attitudes.

Troubles mentaux de guerre. By JEAN LÉPINE. Paris, Masson et Cie, 1917. 203 p.

This is an excellent compend of the subject up to its date. The chief topics are, mental concussion, depressive, neurasthenic, emotional states, chronic nervous trouble, specific diseases; while in part second, we have four chapters of practical applications of these principles. It is a very interesting, suggestive and timely compend, with an admirable bibliography.

A social theory of religious education. By GEORGE ALBERT COE. New York, Charles Scribner's Sons, 1917. 361 p.

This work attempts to answer the question, "What consequences for religious education follow from the now widely accepted social interpretation of the Christian message?" The writer holds that this gives a new meaning to every-day affairs and changes our outlook upon life, our relations to children, politics, etc. Accordingly, he first attempts to define the social standpoint, together with the philosophical setting of the new sociological ideas in education and the place of the individual in such a scheme. He next develops the idea that a social interpretation of Christianity requires social reconstruction in the aims, essentials, process, theory of education, and gives a new function to the church as an educator. The psychological background of a socialized

religious education requires us to study man's social nature, children's faith in God, their religious limitations, struggles with sin, the learning process considered as the achievement of character. Next comes the organization of such an education in family, church school, relations between state and church, the denominational department of religious education; and lastly, he discusses present tendencies in religious education from the social standpoint. The types are Roman-Catholic, dogmatic Protestant, rationalistic Protestant, ecclesiastical type, and finally, that of liberalism.

War-shock; the psycho-neuroses in war psychology and treatment. By M. D. EDER. Philadelphia, P. Blakiston's Son and Co., 1917. 154 p.

This is a very interesting treatment because it is based on a large amount of clinical experience and because the author is a very ardent believer in the method of suggestion. Very interesting are his tables giving in a condensed way a summary of one hundred cases.

Rest, suggestion, and other therapeutic measures in nervous and mental diseases. By FRANCIS X. DERCUM. 2d ed. Philadelphia, P. Blakiston's Son and Co. (c. 1917). 395 p.

This volume was written for the System of Physiological Therapeutics and is a useful book, but many will believe that the chapter on psycho-analysis (pages 334-354) is very inadequate, and it would be very easy to make out that the author has not understood the system he criticizes.

Handicaps of childhood. By H. ADDINGTON BRUCE. New York, Dodd, Mead and Co., 1917. 310 p.

This interesting book in ten chapters treats of the mentally backward, the only child, the sulker, jealousy, selfishness, bashfulness, stammering, fairy tales that handicap, night terrors, and finally, conclusions.

The tree of life. An expose of physical regenesis on the three-fold plane of bodily, chemical and spiritual operation. By GEORGE W. CAREY. Los Angeles, George W. Carey, 1917. 60 p.

An analysis of the learning process in the snail, Physa gyrina Say. By ELIZABETH LOCKWOOD THOMPSON. Behavior Monographs, Vol. 3, no. 3. 1917. Boston, Henry Holt and Co. 97 p.

The effect of length of blind alleys on maze learning: an experiment on twenty-four white rats. By JOSEPH PETERSON. Behavior Monographs, Vol. 3, no. 4, 1917. Boston, Henry Holt and Co. 53 p.

Sull' applicazione dei metodi psico-fisci all'esame dei candidati all'aviazione militare. By AGOSTINO GEMELLI. (Reprinted from Rivista di Psicologia, Agosto, 1917.) Milan, 1917. 42 p.

The Balfour visit. Edited by CHARLES HANSON TOWNE. New York, George H. Doran Co. (c. 1917). 87 p.

The speed and accuracy of motor adjustments. By JOHN J. B. MORGAN. (Reprinted from Journal of Experimental Psychology, June, 1917, Vol. 2, no. 3.) p. 225-248.

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Action of some opium alkaloids on the psychological reaction time. By David I. Macht and Shachne Isaacs. (Reprinted from Psychobiology, July, 1917, Vol. 1, no. 1.) p. 19-32.

Lecciones de antropologia. By Julian Restrepo-Hernandez. Bogota, Casa Editorial de Arboleda y Valencia, 1917. 227 p.

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The association test as a substitute for the quiz. By June E. Downey. (Reprinted from School and Society, July 7, 1917, Vol. 6, no. 132.) p. 23-25.

The Stanford adult intelligence tests. By June E. Downey. (Reprinted from the Journal of Delinquency, May, 1917, Vol. 2, no. 3.) p. 144-155.

NOTICE TO READERS

Until the close of the war, the size of the American Journal of Psychology will be reduced twenty or twenty-five pages per number, making a volume of about five hundred pages.

p	X = -7	X = -6	X = -5	X = -4	X = -3	X = -2	X = -1	X = 0
.01	5.8579	4.3203	3.0080	2.0210	1.1595	.5235	.1127	-.0727
.02	9.7281	7.1974	5.0431	3.2649	1.8631	.8375	.1881	-.0851
.03	12.5809	9.2914	6.4954	4.1930	2.3841	1.0686	.2469	-.0813
.04	15.3119	11.2923	7.8800	5.0749	2.8773	1.2868	.3036	-.0723
.05	17.5872	12.9552	9.0269	5.8024	3.2818	1.4649	.3519	-.0574
.06	19.6082	14.4293	10.0411	6.4437	3.6368	1.6207	.3954	-.0392
.07	21.4324	15.7575	10.9527	7.0181	3.9536	1.7592	.4351	-.0189
.08	23.0983	16.9684	11.7820	7.5391	4.2398	1.8841	.4718	.0031
.09	24.6313	18.0809	12.5423	8.0155	4.5005	1.9973	.5059	.0263
.10	26.0376	19.0998	13.2371	8.4496	4.7373	2.0999	.5376	.0505
.11	27.3456	20.0459	13.8811	8.8507	4.9550	2.1939	.5673	.0753
.12	28.5668	20.9282	14.4803	9.2231	5.1565	2.2805	.5953	.1007
.13	29.6947	21.7416	15.0316	9.5646	5.3406	2.3595	.6215	.1265
.14	30.7546	22.5049	15.5479	9.8835	5.5118	2.4327	.6463	.1526
.15	31.7421	23.2148	16.0270	10.1786	5.6696	2.4999	.6697	.1789
.16	32.6789	23.8875	16.4801	10.4569	5.8178	2.5628	.6921	.2055
.17	33.5392	24.5036	16.8942	10.7102	5.9520	2.6196	.7129	.2319
.18	34.3503	25.0840	17.2831	10.9474	6.0772	2.6723	.7327	.2584
.19	35.1151	25.6302	17.6483	11.1696	6.1938	2.7211	.7515	.2850
.20	35.8361	26.1442	17.9912	11.3773	6.3024	2.7665	.7695	.3116
.21	36.5089	26.6229	18.3097	11.5695	6.4022	2.8080	.7865	.3381
.22	37.1383	27.0696	18.6060	11.7474	6.4942	2.8458	.8025	.3643
.23	37.7315	27.4899	18.8841	11.9140	6.5795	2.8808	.8179	.3906
.24	38.2837	27.8802	19.1413	12.0670	6.6575	2.9126	.8323	.4166
.25	38.8005	28.2446	19.3807	12.2088	6.7292	2.9416	.8460	.4425
.26	39.2815	28.5828	19.6020	12.3392	6.7945	2.9677	.8590	.4682
.27	39.7311	28.8980	19.8075	12.4595	6.8542	2.9905	.8713	.4938
.28	40.1505	29.1911	19.9976	12.5702	6.9084	3.0127	.8830	.5191
.29	40.5354	29.4592	20.1706	12.6698	6.9567	3.0314	.8939	.5441
.30	40.8950	29.7086	20.3307	12.7614	7.0004	3.0481	.9043	.5690
.31	41.2256	29.9368	20.4762	12.8435	7.0390	3.0625	.9140	.5935
.32	41.5304	30.1464	20.6088	12.9177	7.0731	3.0750	.9232	.6179
.33	41.8022	30.3319	20.7251	12.9816	7.1016	3.0849	.9317	.6418
.34	42.0577	30.5056	20.8330	13.0401	7.1269	3.0935	.9398	.6657
.35	42.2810	30.6558	20.9250	13.0889	7.1471	3.1000	.9473	.6892
.36	42.4819	30.7896	21.0057	13.1303	7.1632	3.1045	.9542	.7123
.37	42.6633	30.9092	21.0766	13.1654	7.1758	3.1076	.9607	.7353
.38	42.8156	31.0079	21.1333	13.1919	7.1836	3.1085	.9666	.7578
.39	42.9487	31.0924	21.1803	13.2121	7.1880	3.1080	.9720	.7800
.40	43.0548	31.1576	21.2141	13.2242	7.1880	3.1066	.9768	.8018
.41	43.1459	31.2117	21.2402	13.2315	7.1853	3.1020	.9814	.8235
.42	43.2124	31.2479	21.2541	13.2309	7.1784	3.0966	.9853	.8447
.43	43.2573	31.2687	21.2576	13.2241	7.1681	3.0896	.9888	.8655
.44	43.2815	31.2743	21.2507	13.2107	7.1542	3.0811	.9918	.8866
.45	43.2847	31.2648	21.2335	13.1908	7.1367	3.0712	.9943	.9060
.46	43.2736	31.2422	21.2070	13.1653	7.1162	3.0599	.9964	.9257
.47	43.2305	31.2019	21.1694	13.1327	7.0920	3.0470	.9980	.9449
.48	43.1732	31.1488	21.1225	13.0945	7.0645	3.0326	.9991	.9636
.49	43.0967	31.0817	21.0662	13.0503	7.0339	3.0170	.9998	.9821
.50	43.0000	31.0000	21.0000	13.0000	7.0000	3.0000	1.0000	1.0000

p	X = -7	X = -6	X = -5	X = -4	X = -3	X = -2	X = -1	X = 0
.51	42.8843	30.9047	20.9246	12.9441	6.9631	2.9816	.9998	1.0175
.52	42.7476	30.7942	20.8389	12.8817	6.9227	2.9618	.9991	1.0346
.53	42.5935	30.6711	20.7446	12.8141	6.8796	2.9408	.9980	1.0511
.54	42.4230	30.5334	20.6410	12.7407	6.8332	2.9183	.9964	1.0671
.55	42.2251	30.3818	20.5271	12.6610	6.7835	2.8946	.9943	1.0826
.56	42.0115	30.2161	20.4041	12.5757	6.7308	2.8695	.9918	1.0978
.57	41.7777	30.0357	20.2712	12.4843	6.6749	2.8430	.9888	1.1121
.58	41.5252	29.8419	20.1293	12.3873	6.6160	2.8154	.9853	1.1259
.59	41.2511	29.6327	19.9770	12.2841	6.5537	2.7862	.9814	1.1393
.60	40.9540	29.4070	19.8135	12.1738	6.4876	2.7554	.9768	1.1518
.61	40.6451	29.1728	19.6445	12.0603	6.4202	2.7242	.9720	1.1640
.62	40.3102	28.9201	19.4631	11.9393	6.3486	2.6909	.9666	1.1754
.63	39.9587	28.6554	19.2736	11.8132	6.2742	2.6568	.9607	1.1861
.64	39.5793	28.3708	19.0707	11.6789	6.1956	2.6207	.9542	1.1961
.65	39.1834	28.0744	18.8600	11.5401	6.1145	2.5836	.9473	1.2054
.66	38.7691	27.7650	18.6406	11.3959	6.0307	2.5455	.9398	1.2139
.67	38.3240	27.4335	18.4063	11.2426	5.9422	2.5053	.9317	1.2216
.68	37.8666	27.0932	18.1664	11.0859	5.8519	2.4644	.9232	1.2285
.69	37.3802	26.7324	17.9126	10.9209	5.7572	2.4217	.9140	1.2345
.70	36.8714	26.3556	17.6483	10.7496	5.6592	2.3775	.9043	1.2396
.71	36.3382	25.9614	17.3724	10.5712	5.5577	2.3318	.8939	1.2437
.72	35.7841	25.5525	17.0868	10.3870	5.4530	2.2851	.8830	1.2469
.73	35.2007	25.1226	16.7871	10.1943	5.3440	2.2373	.8713	1.2488
.74	34.5925	24.6752	16.4760	9.9948	5.2315	2.1863	.8590	1.2498
.75	33.9589	24.2098	16.1529	9.7880	5.1154	2.1346	.8460	1.2495
.76	33.2959	23.7236	15.8161	9.5732	4.9949	2.0814	.8323	1.2480
.77	32.6045	23.2175	15.4661	9.3506	4.8705	2.0264	.8179	1.2452
.78	31.8801	22.6878	15.1006	9.1184	4.7414	1.9694	.8025	1.2407
.79	31.1275	22.1383	14.7221	8.8787	4.6084	1.9110	.7865	1.2349
.80	30.3409	21.5648	14.3278	8.6297	4.4706	1.8505	.7695	1.2274
.81	29.5165	20.9646	13.9159	8.3702	4.3276	1.7879	.7515	1.2180
.82	28.6593	20.3416	13.4891	8.1020	4.1802	1.7239	.7327	1.2070
.83	27.7676	19.6940	13.0464	7.8244	4.0282	1.6578	.7129	1.1939
.84	26.8397	19.0215	12.5873	7.5373	3.8714	1.5896	.6921	1.1787
.85	25.8521	18.3066	12.1004	7.2336	3.7062	1.5183	.6697	1.1605
.86	24.8298	17.5675	11.5979	6.9211	3.5368	1.4451	.6463	1.1400
.87	23.7543	16.7914	11.0714	6.5944	3.3604	1.3695	.6215	1.1165
.88	22.6316	15.9822	10.5235	6.2555	3.1781	1.2913	.5953	1.0899
.89	21.4414	15.1257	9.9451	5.8987	2.9870	1.2099	.5673	1.0593
.90	20.1920	14.2284	9.3401	5.5268	2.7887	1.1255	.5376	1.0247
.91	18.8761	13.2849	8.7055	5.1379	2.5821	1.0381	.5059	.9855
.92	17.4739	12.2814	8.0324	4.7269	2.3650	.9467	.4718	.9405
.93	15.9844	11.2175	7.3207	4.2941	2.1376	.8512	.4351	.8891
.94	14.3928	10.0831	6.5641	3.8359	1.8982	.7515	.3954	.8300
.95	12.6762	8.8626	5.7529	3.3470	1.6448	.6465	.3519	.7612
.96	10.8011	7.5333	4.8728	2.8195	1.3737	.5350	.3036	.6795
.97	8.6423	6.0092	3.8696	2.2236	1.0711	.4122	.2469	.5751
.98	6.4503	4.4660	2.8579	1.6261	.7705	.2913	.1881	.4613
.99	3.6335	2.4665	1.5250	.9088	.4181	.1527	.1127	.2981

p	X=1	X=2	X=3	X=4	X=5	X=6	X=7
.51	3.0348	7.0516	13.0679	21.0839	31.0994	43.1145	57.1291
.52	3.0683	7.1000	13.1299	21.1581	31.1843	43.2088	57.2314
.53	3.1002	7.1450	13.1858	21.2225	31.2552	43.2835	57.3079
.54	3.1306	7.1869	13.2358	21.2777	31.3122	43.3402	57.3644
.55	3.1595	7.2250	13.2791	21.3218	31.3531	43.3730	57.3815
.56	3.1870	7.2599	13.3164	21.3565	31.3801	43.3873	57.3781
.57	3.2130	7.2914	13.3473	21.3809	31.3920	43.3807	57.3469
.58	3.2371	7.3190	13.3716	21.3947	31.3885	43.3529	57.2880
.59	3.2600	7.3432	13.3893	21.3981	31.3696	43.3039	57.2007
.60	3.2804	7.3630	13.3992	21.3890	31.3325	43.2298	57.0808
.61	3.3000	7.3800	13.4042	21.3723	31.2845	43.1406	56.9409
.62	3.3174	7.3925	13.4006	21.3421	31.2167	43.0245	56.7654
.63	3.3329	7.4012	13.3910	21.3020	31.1346	42.8886	56.5641
.64	3.3464	7.4051	13.3722	21.2477	31.0315	42.7238	56.3245
.65	3.3581	7.4052	13.3469	21.1831	30.9138	42.5392	56.0588
.66	3.3676	7.4011	13.3143	21.1071	30.7796	42.3320	55.7639
.67	3.3749	7.3915	13.2716	21.0150	30.6219	42.0921	55.4258
.68	3.3802	7.3784	13.2231	20.9141	30.4516	41.8356	55.0660
.69	3.3830	7.3595	13.1642	20.7967	30.2574	41.5460	54.6628
.70	3.3835	7.3357	13.0966	20.6660	30.0439	41.2304	54.2252
.71	3.3813	7.3066	13.0195	20.5204	29.8090	40.8854	53.7494
.72	3.3768	7.2723	12.9340	20.3616	29.5550	40.5145	53.2397
.73	3.3689	7.2307	12.8370	20.1849	29.2755	40.1086	52.6843
.74	3.3586	7.1853	12.7301	19.9928	28.9736	39.6724	52.0891
.75	3.3450	7.1328	12.6124	19.7842	28.6481	39.2040	51.4521
.76	3.3283	7.0732	12.4829	19.5570	28.2959	38.6994	50.7675
.77	3.3083	7.0068	12.3413	19.3114	27.9173	38.1589	50.0361
.78	3.2839	6.9324	12.1858	19.0442	27.5078	37.5764	49.2503
.79	3.2563	6.8506	12.0178	18.7581	27.0713	36.9573	48.4163
.80	3.2243	6.7603	11.8352	18.4491	26.6020	36.2940	47.5249
.81	3.1875	6.6603	11.6360	18.1148	26.0965	35.5816	46.5695
.82	3.1467	6.5515	11.4218	17.7574	25.5585	34.8246	45.5563
.83	3.1007	6.4330	11.1912	17.3752	24.9850	34.0200	44.4814
.84	3.0495	6.3044	10.9434	16.9667	24.3741	33.1657	43.3415
.85	2.9907	6.1603	10.6694	16.5178	23.7056	32.2328	42.0995
.86	2.9263	6.0055	10.3772	16.0415	22.9985	31.2483	40.7906
.87	2.8545	5.8355	10.0596	15.5266	22.2366	30,1896	39.3857
.88	2.7751	5.6511	9.7177	14.9749	21.4227	29.0614	37.8906
.89	2.6859	5.4471	9.3428	14.3731	20.5379	27.8373	36.2716
.90	2.5870	5.2243	8.9367	13.7242	19.5869	26.5246	34.5374
.91	2.4769	4.9801	8.4951	13.0219	18.5605	25.1109	32.6731
.92	2.3528	4.7085	8.0078	12.2507	17.4370	23.5670	30.6405
.93	2.2133	4.4076	7.4720	11.4067	16.2115	21.8865	28.4316
.94	2.0554	4.0713	6.8782	10.4757	14.8639	20.0429	26.0124
.95	1.8743	3.6911	6.2118	9.4362	13.3645	17.9966	23.3324
.96	1.6626	3.2532	5.4509	8.2559	11.6682	15.6877	20.3147
.97	1.3971	2.7122	4.5211	6.8236	9.6196	12.9092	16.6923
.98	1.1107	2.1363	3.5383	5.3163	7.4707	10.0012	12.9081
.99	.7089	1.3451	2.2065	3.2934	4.5056	6.0433	7.8063

p	X=1	X=2	X=3	X=4	X=5	X=6	X=7
.01	-.0327	.2327	.7235	1.4396	2.2810	3.4479	4.8403
.02	.0179	.4973	1.3529	2.5847	4.1927	6.1770	8.5375
.03	.0843	.7430	1.8953	3.5414	5.6810	8.3142	11.4409
.04	.1590	.9978	2.4437	4.4969	7.1574	10.4251	14.3003
.05	.2371	1.2355	2.9376	5.3436	8.4533	12.2668	16.7842
.06	.3170	1.4637	3.4012	6.1295	9.6485	13.9583	19.0586
.07	.3973	1.6836	3.8400	6.8667	10.7635	15.5305	21.1676
.08	.4780	1.8963	4.2582	7.5637	11.8126	17.0052	23.1413
.09	.5585	2.1025	4.6583	8.2259	12.8053	18.3965	24.9995
.10	.6386	2.3015	5.0397	8.8530	13.7415	19.7048	26.7434
.11	.7179	2.4951	5.4068	9.4531	14.6339	20.9491	28.3994
.12	.7967	2.6835	5.7609	10.0289	15.4875	22.1370	29.9770
.13	.8745	2.8655	6.0994	10.5764	16.2964	23.2594	31.4653
.14	.9515	3.0431	6.4274	11.1043	17.0737	24.3361	32.8910
.15	1.0275	3.2155	6.7428	11.6096	17.8158	25.3614	34.2463
.16	1.1031	3.3848	7.0506	12.1007	18.5349	26.3533	35.5559
.17	1.1767	3.5472	7.3434	12.5654	19.2132	27.2864	36.7858
.18	1.2495	3.7059	7.6276	13.0148	19.8673	28.1850	37.9681
.19	1.3215	3.8611	7.9038	13.4494	20.4981	29.0500	39.1049
.20	1.3927	4.0127	8.1718	13.8699	21.1070	29.8830	40.1981
.21	1.4627	4.1600	8.4304	14.2737	21.6901	30.6791	41.2413
.22	1.5311	4.3032	8.6802	14.6624	22.2496	31.4418	42.2393
.23	1.5991	4.4432	8.9231	15.0388	22.7901	32.1773	43.1999
.24	1.6655	4.5792	9.1575	15.4004	23.3079	32.8800	44.1169
.25	1.7310	4.7118	9.3846	15.7494	23.8063	33.5552	44.9965
.26	1.7954	4.8407	9.6039	16.0852	24.2844	34.2016	45.8369
.27	1.8589	4.9675	9.8168	16.4097	24.7451	34.8232	46.6439
.28	1.9212	5.0891	10.0230	16.7228	25.1886	35.4203	47.4177
.29	1.9821	5.2078	10.2213	17.0226	25.6116	35.9884	48.1530
.30	2.0423	5.3239	10.4142	17.3130	26.0203	36.5362	48.8604
.31	2.1010	5.4367	10.6004	17.5921	26.4118	37.0596	49.5354
.32	2.1590	5.5466	10.7807	17.8611	26.7880	37.5612	50.1810
.33	2.2153	5.6523	10.9526	18.1164	27.1435	38.0341	50.7880
.34	2.2712	5.7567	11.1217	18.3665	27.4908	38.4950	51.3789
.35	2.3257	5.8564	11.2819	18.6019	27.8164	38.9254	51.9288
.36	2.3788	5.9537	11.4370	18.8287	28.1289	39.3374	52.4543
.37	2.4313	6.0488	11.5878	19.0482	28.4300	39.7332	52.9579
.38	2.4822	6.1397	11.7304	19.2543	28.7113	40.1015	53.4248
.39	2.5320	6.2282	11.8684	19.4525	28.9807	40.4530	53.8693
.40	2.5804	6.3128	11.9988	19.6386	29.2319	40.7792	54.2800
.41	2.6284	6.3958	12.1261	19.8191	29.4748	41.0933	54.6743
.42	2.6747	6.4754	12.2468	19.9887	29.7013	41.3845	55.0384
.43	2.7198	6.5516	12.3609	20.1479	29.9124	41.6545	55.3741
.44	2.7638	6.6251	12.4698	20.2983	30.1103	41.9059	55.6849
.45	2.8063	6.6952	12.5727	20.4388	30.2935	42.1368	55.9687
.46	2.8478	6.7625	12.6700	20.5703	30.4634	42.3486	56.2310
.47	2.8878	6.8264	12.7610	20.6915	30.6180	42.5403	56.4585
.48	2.9263	6.8872	12.8461	20.8033	30.7587	42.7122	56.6638
.49	2.9640	6.9454	12.9263	20.9069	30.8870	42.8667	56.8459
.50	3.0000	7.0000	13.0000	21.0000	31.0000	43.0000	57.0000